UNIVERSIDAD CARLOS III DE MADRID

TESIS DOCTORAL

THREE ESSAYS ON STRATEGIC DECISION MAKING AND CEO BEHAVIOR IN FAMILY FIRMS

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DEPARTAMENTO DE ECONOMÍA DE LA EMPRESA

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Abstract

This thesis analyzes how strategic decision-making and CEO behavior differ between family and non-family firms. Several aspects of this broad research question have been addressed in three chapters, as follows. The first chapter integrates the behavioral agency and family business literature to analyze the role of dominant family owners in constraining the CEO´s risk taking response to equity-based pay. The second chapter re-visits the issue of temporal orientation and investigates whether family firms are indeed longer-term oriented than non-family firms. Finally, the third chapter analyzes the role of dominant family owners in aligning family firms´ innovation objectives with the economic objectives of their CEOs.

Esta tesis analiza cómo las decisiones estratégicas y el comportamiento de los CEOs difieren entre empresas familiares y no familiares. Diversos aspectos sobre este amplio tópico de investigación se han estudiado en tres capítulos. El primer capítulo integra la literatura de la teoría de la agencia del comportamiento y de las empresas familiares para analizar el rol dominante de los dueños para limitar el riesgo de las reacciones de los CEOs ante la retribución basada en capital empresarial. El segundo capítulo re-investiga el problema del horizonte temporal e investiga si las empresas familiares están orientadas más a largo plazo que las empresas no familiares. Finalmente, el tercer capítulo analiza el rol de los dueños dominantes de las empresas familiares para alinear los objetivos de la innovación de sus empresas familiares con los objetivos económicos de sus CEOs.

Contents

Introduction

My research interest lies within the broad fields of entrepreneurship and strategy, with a main focus on behavioral agency and family firm research. Specifically, I am investigating the processes by which a firm's ownership structure predicts strategic decision-making and managerial behavior. The field of behavioral agency in the management literature has previously sought to enhance the predictive validity of models that forecast firm strategic decision-making and managerial behavior. What this theory currently lacks is an appreciation of the role of firm principal risk bearing (wealth-at-risk) in this process. My research papers underline the role of dominant family owners in restraining the strategic decision-making process and the importance of ownership structure within frameworks predicting (1) the CEO´s risk-taking behavior in response to equity pay, (2) differences in the firms´ temporal orientation and (3) the sensitivity of the relationship between firm innovation resonance and CEO pay.

I analyze the effect of ownership structure upon firm strategic decision-making and managerial behavior through the lens of the behavioral agency model (BAM), derived from the combination of prospect theory and behavioral theory (Wiseman and Gomez-Mejia, 1998). According to this framework, family owners´ loss aversion to socioemotional wealth (SEW), or the stock of non-economic utility family owners invested in the firm (Gomez-Mejia et al., 2007), represents the main reference point for strategic decision-making (e.g., Berrone et al., 2010; Chrisman and Patel, 2012; Gómez-Mejía et al., 2007, 2010). That is, family firms will take risky decisions to preserve SEW at the expense of firm´s long-term financial wealth, yet they will also avoid taking risky decisions that may increase financial wealth to minimize the loss of SEW that is considered assured. For instance, when making strategic decisions, family firms will trade off economic and non-economic goals such as R&D investments (Block, 2012; Chrisman and Patel, 2012; Gomez-Mejia et al., 2014; Muñoz-Bullon and Sanchez-Bueno, 2011; Patel and Chrisman, 2014), international diversification (Gomez-Mejia et al., 2010; Miller et al., 2010), asset divestiture (Feldman et al., 2014), joining a cooperative (Gómez-Mejía et al., 2007) and its environmental strategy (Berrone et al., 2010), among others, to protect and prolong the

socioemotional endowment characterizing the firm. While BAM and socioemotional literature have been combined in the past, the BAM s core prediction with regard to strategic decision-making is yet to be explored in the context of family firms. I integrate BAM and family business research to understand how the risk bearing of family principals – in the form of financial and socioemotional wealth – influences firm strategic decision-making and managerial behavior.

The first chapter of my dissertation, *"CEO Risk Taking and Ownership Structure: The Behavioral Agency Model, Family Control and CEO Option Wealth"* (with Professors Luis Gomez-Mejia and Geoff Martin), focuses on the role of dominant firm principals (owners) in understanding the effect of CEO incentives on firm s risk taking decisions. The analysis is based on the special case of family controlled firms, which is the prevalent ownership form around the world. We develop and test the theoretical model on the settings of the behavioral agency model as a mixed gamble (Martin et al., 2013) and provide evidence that family principals (owners) have an inclination to monitor and constrain CEOs´ ability to preserve the accumulated value of their current option wealth or to pursue additional option value through more conservative or more aggressive risk-taking behavior. We show that the application of agency logic, which emphasizes the use of equity-based pay as an incentivizing alignment system designed to channel CEO risk-taking behaviors, may be destined to fail in firms with a dominant family shareholder. We argue that the family effect is stronger when the firm is vulnerable to dual socioemotional and financial losses (such as in situations when firm performance doesn t meet aspirations, when the risk of bankruptcy is high and when the CEO has long tenure with the firm), and weaker when the CEO is a family member. This study raises a fascinating question for future research: Why would a non-family candidate for a CEO position be willing to accept the top job at a family firm given the constraining forces presented in the paper?

My second paper, *"Family Firm Investment Horizons: Re-visiting the Effect of Ownership Structure upon Temporal Orientation"* (with Professors Luis Gomez-Mejia and Geoff Martin) offers explanations that reconcile previous conflicting perspectives on family firms temporal orientation relative to non-family firms, drawing upon the concepts of socioemotional wealth and loss aversion. We re-visit this issue by using an alternative proxy for temporal orientation – namely, durability of investments in fixed assets, such as plant, property

and equipment (Souder and Bromiley, 2012) – that offers a more direct measure of firm s decisional time horizon than previous proxies, such as R&D or diversification. We find strong support for the hypothesis that family ownership is associated with a longer temporal orientation, challenging suggestions that family firms may not in fact adopt a longer temporal orientation than their non-family counterparts. We also show that the differences between family and non-family firm investment horizons are contingent upon the presence of other blockholders on the share registry as well as debt holders – higher ownership by external blockholders and higher levels of debt financing attenuate the family effect – but remain stronger for family firms across all performance levels. Our findings provide important caveats for discrepancies in decision making of family and non-family firms.

In the third paper, *"Family Firms and Principal-Agent Incentive Alignment: The Use of Incentives and Technological Intensity"* (with Professors Luis Gomez-Mejia and Geoff Martin), we build on the behavioral agency and family business literature to analyze the role of dominant family owners in aligning family firms´ socioemotional and economic objectives with the economic objectives of their CEOs. Family business research on the innovation – CEO compensation relationship in technology-intensive firms has focused on the way family owners align CEO pay with the R&D inputs (R&D investments) and R&D outputs (number of patents and patent citations), ignoring the importance of considering both innovation and performance criteria when analyzing the sensitivity of the relationship between CEO pay and firm results. We contribute to this research by showing that family owners are more likely than their non-family counterparts to reward their CEOs for the resonance of firm innovations (measured as patent citations) rather than on performance bases (measured as return on assets). We find strong support for our hypothesis that the greater the technological intensity of a firm, the closer family firms will link CEO pay to innovation resonance as opposed to firm performance. That is, despite the fact that family firms have been found to have lower R&D intensity relative to non-family firms, we advance the idea that family firms are likely to achieve more successful R&D investments relative to their non-family counterparts. As a result of a better understanding of the family business, closer monitoring, and a stronger alignment between firm management and family owners, family firms are more likely than non-family firms to achieve lower agency costs and more successful R&D investments.

Chapter 1

CEO Risk-taking and Ownership Structure: The Behavioral Agency Model, Family Control, and CEO Option Wealth

1.1 Introduction

Firm risk-taking is a core variable of interest in most business fields under the general presumption that an appropriate level of risk is necessary to obtain superior returns (Miller and Bromiley, 1990; Sanders and Hambrick, 2007). Much of this literature focuses on the CEO as the key decision maker who takes risks on behalf of the firm in response to the incentive features of the agency contract (e.g., Sanders, 2001; Devers et al., 2008; Larraza-Kintana et al., 2007). The classical agency model argues that equity ownership encourages risk-averse CEOs to take more risk in their strategic choices, with the expectation that such choices tend to enhance the value of their equity in the firm (Dalton et al., 2007). In contrast, the behavioral agency model (BAM), which combines elements of prospect and agency theory, predicts that the accumulated value of stock options previously awarded to CEOs creates risk bearing (perceived wealth-at-risk) and, given loss aversion (the preference for loss avoidance over the pursuit of gains; Kahneman and Tversky, 1979), that this makes the CEO more reluctant to take risks (Wiseman and Gomez-Mejia, 1998; Denya et al., 2005)[1]. A more recent refinement of BAM by Martin and colleagues (2013) proposes that CEOs balance the fear of losing current endowed option wealth (which

[1] This translates to a predicted negative relationship between agent risk bearing and risk-taking (Wiseman and Gomez-Mejia 1998).

produces risk aversion) with the prospect of enhancing the value of their future wealth by taking more risks (what these authors refer to as the mixed gamble inherent in equity-based incentives, which is empirically supported in their study).

In parallel to the study of agent risk preferences, BAM has also been used by some scholars to examine the unique risk bearing (and risk preferences) of family principals, where the firm-specific endowment of family owners includes a combination of financial and socioemotional wealth (SEW), with the latter defined as "the stock of affect related value the family has invested in the firm" (Gomez-Mejia et al., 2007: 107). According to this literature, the dual set of utilities of family principals—that is, financial and socioemotional, as opposed to the singular focus on financial risk bearing by non-family principals—serves to explain differences in family principals´ strategic choices relative to non-family principals, such as choices regarding diversification (Gomez-Mejia et al., 2010), R&D investments (Chrisman and Patel, 2012), pollution control and prevention efforts (Berrone et al., 2010), and divestitures (Zellweger et al., 2012).

While BAM and socioemotional literatures have been combined in the past, the BAM s core prediction with regard to CEO response to compensation related risk bearing is yet to be explored in the context of family firms. That is, there has been no attempt to integrate BAM and family business research in order to understand how the risk bearing of family principals (in the form of financial and SEW considerations) influences BAM s hypothesized CEO (agent) risk-taking in response to equity-based incentives. In this study, we bridge the study of agent and family principal risk preferences by arguing that BAM s predicted CEO response to risk bearing associated with stock options is likely to vary by ownership structure. We suggest that both CEO risk aversion (in trying to protect current wealth) and risk-seeking (in the pursuit of prospective wealth) augment family principals´s risk bearing, given that these agent behaviors increase the probability of what we will refer to as synoptic losses, or dual SEW and financial losses for the family, if the firm were to lag competitors and/or perhaps fail to survive. The unique nature of family owners leads them to constrain both: (1) CEOs´ risk-averse behavior to protect current option wealth; and (2) CEOs´ risk-seeking behavior to pursue prospective option wealth.

In order to examine the contingencies that help explain family firms heterogeneity in the discretion their CEOs enjoy when responding to option plans (as predicted by BAM), we

hypothesize that family vulnerability to synoptic losses (and thus family risk bearing) is highest under certain conditions, such as under high probability of bankruptcy and when the firm fails to meet historical and social aspirations. We further hypothesize that two CEO characteristics—namely, CEO tenure and CEO blood ties to the family—also influence the extent to which family owners associate the potential for synoptic losses with BAM s predictions concerning the CEO s response to equity based incentives. Most of these hypotheses are strongly supported.

We offer three related yet important unique contributions to these literatures. First, we refine BAM s predictions with regard to agent (CEO) risk-taking by demonstrating the influence of the firm s ownership structure, which moderates the risk incentive features of the agency contract. Our core hypotheses, supported by empirical findings, suggest that family principals´ acquiescence in, or constraint of CEO behaviors (predicted by BAM) depends on the relative alignment or misalignment of agent risk preferences with the family s risk preferences. One broad implication of our study is that the linkage between monitoring and incentive alignment appears to vary depending on the motives of the dominant principal; close monitoring by family principals may constrain the expected influence of the incentive alignment system (using equity based pay) on CEO strategic choices when CEO and family risk preferences diverge.

Second, we show that family principals inclination to constrain the CEO s response to equity incentives is dependent upon family exposure (or vulnerability) to synoptic losses – losses of both socioemotional and financial wealth – that are a potential consequence of the CEO s strategic response to those incentives. Prior research on BAM has focused on CEOs´ vulnerability to losses when responding to incentives (c.f., Martin et al., 2013) without considering the concurrent vulnerability of the dominant principals. We shift this focus by examining the vulnerability to losses of family principals relative to the CEO, and how this differs from non-family owners. We argue that family principals bear higher risks than CEOs and non-family shareholders; thus the family principals are more likely to look for heuristics (such as signs of bankruptcy and performance levels relative to aspirations) to assess family vulnerability to synoptic losses. This in turn shapes the family principals´ decision to constrain or acquiesce in the risks CEOs take to pursue prospective wealth (and thus presumably enhance the long-term competitiveness of the firm) or the risks CEOs decline to preserve the current wealth

embedded in their options (and thus avoid the uncertainty associated with actions geared to pursue prospective wealth).

Finally, we provide insight into a paradoxical question that arises from our theory and results: why do publicly traded family-controlled firms adopt equity-based incentives as their non-family-controlled counterparts, but not allow the CEO to respond to these risk incentives in the same manner? Our empirically supported theory suggests that there are occasions when equity incentives cause the risk preferences of the CEO and the family principals to diverge, making the granting of stock options more symbolic. Conversely, when principal–agent risk preferences converge, family principals allow CEOs to respond to stock options in a substantive fashion. Refining the conclusions of Zajac and Westphal (1994), who attributed the "decoupling phenomena" to CEO opportunism, our theory suggests that it is the family principal who decides whether to use equity-based incentives symbolically or substantively.

1.2 Theory and Hypotheses

1.2.1 The Behavioral Agency Model, CEO Incentives, and Firm Risk-Taking

An agency relationship exists whenever "one party (the principal) delegates work to another (the agent), who performs that work" (Eisenhardt, 1989: 545). According to traditional agency writings, because CEOs´ (or agents´) personal wealth and reputation are tightly connected to the firm, they have significant firm-specific wealth and are considered *risk averse* (Eisenhardt, 1989). On the other hand, shareholders (or principals) are considered risk-neutral as they can diversify their portfolios in order to protect themselves against major financial risks and prefer riskier strategic actions associated with high economic returns (Fama and French, 1992). Outcome-based contracts have been proposed as a potential solution to this agency problem (characterized by divergence in the risk profiles of principal and agent), with equity-based compensation being a preferred means of creating so-called incentive alignment or the prospects of "win/win" situations for CEOs and shareholders (Jensen and Murphy, 1991; Nyberg et al., 2010).

By combining elements from traditional agency theory with behavioral research examining decision-making under risk, BAM challenges the assumption of fixed CEO risk-taking preferences. Specifically, utilizing the concepts of loss aversion and risk bearing from

behavioral research (March and Shapira, 1992; Bazerman, 1994; Kahneman and Tversky, 1979; Tversky and Kahneman, 1991), BAM proposes that CEOs´ risk preferences are context-dependent and that their risk bearing (wealth-at-risk) will negatively influence risk-taking (Wiseman and Gomez-Mejia, 1998). Accordingly, based on the assumption that agents are loss averse, BAM hypothesizes that CEOs are predisposed to take greater risk in order to prevent possible wealth losses and avoid risk-taking in order to minimize the loss of wealth that is considered assured (Larraza-Kintana et al., 2007; Wiseman and Gomez-Mejia, 1998).

Given the need to reconcile the two opposite views (the agency theory and the behavioral agency theory), a refinement of BAM by Martin and colleagues (2013)—building on Bromiley s (2010) notion of mixed gambles—notes that CEOs should be aware of the potential for both *gains and losses* to option wealth when making strategic decisions. On the one hand, the agent (or CEO) could lose accumulated equity (current wealth) if risk-taking fails, which would tend to promote risk-averse strategic choices. Yet on the other hand, the agent could further increase the value of equity wealth if risk-taking is successful (prospective wealth), which would tend to foster higher-risk strategic choices. This dynamic reflects the logic that the vast majority of strategic decisions will have the potential to both negatively and positively influence the firm s stock price and suggests that the agent s conservatism (loss aversion to current wealth) will be attenuated by the prospect of increasing wealth in the future.

We conclude from the above review of behavioral agency research that senior executives are prone to manage firm risk to (1) protect their personal wealth, becoming more risk-averse, or (2) enhance their prospects of greater future wealth, becoming more risk-seeking (agency scholars such as Jensen and Meckling [1976] and Nyberg et al. [2010] espouse the latter as a primary intended objective of awarding the agent with equity pay). However, what is missing from this theoretical framework is the possible intervention of dominant principals who, in response to their risk bearing, might weaken or strengthen the predicted behavioral effect of the agent s current or prospective wealth. Next, we attend to this issue by discussing the influence of family principals in curbing or allowing CEOs´ discretionary risk behavior in response to equity-based pay.

1.2.2 Behavioral Agency, Family Control and Socioemotional Wealth

Gomez-Mejia and colleagues (2007, 2010) developed a "socioemotional wealth model" as a general extension of BAM to explain decision-making in family firms. According to this model, family owners face dual SEW and economic reference points when framing contexts of gains and/or losses. Because SEW depends on the economic viability of the firm, its reference point takes priority as long as firm survival is not in question. However, as the firm s probability of failure increases, family firms may make economically driven decisions designed to keep the firm afloat, thus attempting to preserve the overall stock of SEW as well as ensuring the family s economic sustenance (that is, attempting to avoid what we call synoptic losses). For instance, under financial distress the family firm may boost R&D investments even if this implies dependence on experts from outside the family circle (Gomez-Mejia et al., 2014), engage in greater diversification which dilutes family influence (Gomez-Mejia et al., 2010), join a co-op which gives power to an external party (Gomez-Mejia et al., 2007), or replace a long-tenured family CEO with someone from outside the family (Gomez-Mejia et al., 2001).

There is mounting evidence that family firms may be more or less risk-averse depending on the need to preserve family SEW, avoid economic losses, or both, since SEW cannot exist independent of the firm s economic viability (see review by Gomez-Mejia et al., 2011). For instance, to retain control, the family may neglect lucrative opportunities such as joining a co-op (Gomez-Mejia et al., 2007) or avoid investing in R&D, given R&D increases information asymmetries for the family and potentially dilutes family control; Gomez-Mejia et al., 2014). Other elements of SEW—such as dynastic succession, maintenance of binding social ties within the firm, the perpetuation of family identity embedded in the firm, and the continued exercise of control into the future—demand that the firm remain competitive in the long term and thus be able to survive (Chrisman and Patel, 2012). Thus, the challenge for family principals is to find a risk level whereby the firm takes sufficient, but not excessive risks, to improve its survival odds and hence avoid synoptic losses – the loss of socioemotional and financial wealth, catalyzed by the latter. This challenge in turn means that the family principal would need to consider the extent to which agent risk behaviors, induced by the incentive system, are congruent with the family s risk preferences. If these are congruent—that is, if the risk preferences of family principals and the managerial agent are in alignment—one would expect the family to give

managerial agents greater autonomy to respond (without constraint) to the incentive system; if not, the family may use its monitoring capacity to curtail an excessive risk-taking response by the agent (either on the risk-averse or the risk-seeking side) in an attempt to prevent synoptic losses.

1.2.3 Risk Bearing of Family Principals, Non-Family Principals and CEO

Compared to non-family shareholders (or principals), the family principal faces higher risk bearing and vulnerability to loss as a result of CEO risk behavior (either risk-averse or risk-seeking) perceived as inconsistent with the family principals risk preferences for three related reasons. First, the family has idiosyncratic firm-specific socioemotional endowment (Gomez-Mejia et al., 2007), which is less likely to be diversified relative to non-family principals who may benefit from high-risk/high-return strategies across all firms in their portfolio (Anderson and Reeb, 2003). Second, family owners face an additional difficulty if they choose to exit their investment in the firm, due to the presence of a “family handcuff”, or the family s emotional attachment to and strong identification with the firm they or their ancestors founded (Gomez-Mejia et al., 2003). Lastly the family s fate is generally tied to a single organization, unlike diversified non-family shareholders; thus threats to the family firm may imply catastrophic losses both in terms of SEW and the family s economic welfare (synoptic losses).

The family principal also bears more risk than agents who take risks on behalf of the firm for two reasons. First, the CEO has the option to leave the firm and search for alternative employment possibilities, without the same emotional or economic downside than the family would face if it were forced to exit the firm (Amit and Villalonga, 2014). Thus, the CEO is likely to have less firm-specific risk bearing. Second, CEOs can manage their loss exposure better than the family principal due to their informational advantage, allowing them to decide when might be the best time to exit the firm to minimize private losses in personal wealth; for example, the CEO may uniquely have access to internal data suggesting that a new product launch may not be as successful as expected or that a crucial milestone may not be met (Mishra and McConaughy, 1999).

We now develop hypotheses concerning family principals´ constraint of CEO risk-taking by analyzing the CEOs´ response to their option wealth (as predicted by BAM) and the alignment of that response with the family principals´ risk preferences.

1.2.4 CEO Incentive System and Risk Preferences of Family

We argue that the family principals are more likely than non-family principals to be vigilant in monitoring CEO risk behaviors in an attempt to avoid synoptic losses (that is, the combination of SEW and financial losses). Thus, we suggest that family principals will be more sensitive to both CEO risk aversion and CEO risk seeking in response to current and prospective wealth (respectively). There are several reasons for this deviation from BAM s predictions when the family is a dominant owner.

Constraining CEO risk behavior. As noted earlier, the behavioral agency literature suggests that CEOs are expected to take fewer risks as their current option wealth increases (because their risk bearing rises with option wealth; Wiseman and Gomez-Mejia, 1998), yet they are prone to taking more risks if they anticipate that higher levels of option wealth (prospective wealth) may be forthcoming (Martin et al., 2013). At the other end of the risk spectrum, risk-seeking increases performance variance because of the inherently higher ex-ante uncertain nature of future outcomes associated with aggressive risks (Bromiley et al., 2001; Sanders and Hambrick, 2007). As per our prior discussion, for diversified shareholders the latter is less of a concern relative to shareholders with concentrated firm-specific investments, given that high-risk/high-return strategies are purported to increase the overall value of the firms in their portfolio (Baysinger and Hoskisson, 1990). Agent risk bearing may also be reduced because agents are less vulnerable to large losses in personal wealth (human capital or financial) given that they enjoy an information advantage (relative to firm principals) that allows them to search for another employer and exit vested firm equity investments (prior to incurring large wealth losses) if future prospects are poor due to overly conservative (in response to current wealth) or overly aggressive (in response to prospective wealth) risk-taking (Mishra and McConaughy, 1999).

It is clear from the above that non-family principals and CEOs reduce the consequences of—or vulnerability to—firm-specific losses resulting from conservatism or aggression in strategic choices through diversification (by non-family principals) and information advantages

and alternative employment opportunities (for the CEO). Yet for family owners, as discussed earlier, CEO risk aversion or CEO risk-seeking incentivized by stock options creates a vulnerability that is less easily mitigated, as a decline in firm performance may entail potentially catastrophic firm-specific synoptic losses.

We suggest that the family principals synoptic (financial and socioemotional) risk bearing described above leads family principals to place a higher subjective value on the firm than non-family principals (Gimeno et al., 1997; Zellweger et al., 2012). As a result of this expanded sense of family firm wealth-at-risk of loss (risk bearing), that "includes both psychic and financial elements" [Gimeno et al., 1997: 752]), family owners are more likely (than their non-family counterparts) to vigilantly monitor CEO strategic choices to ensure they are not: (1) too risk averse, given failure to take sufficient risk could adversely impact the firm s competitive position, creating vulnerability to synoptic losses; or (2) too risk seeking, given excessive risk taking could be perceived as exposing the firm to financial losses that could lead to catastrophic loss of SEW.

In sum, family principals are likely to closely monitor the CEO s risk response to incentive alignment mechanisms, such as the granting of stock options, in an attempt to ensure that their firm achieves a level of risk less likely to expose the family to synoptic losses. Thus, we expect dominant family principals to be more vigilant and resistant with regard to CEO risk aversion and CEO risk-seeking than their non-family counterparts.

Hypothesis 1a. Dominant family principals are more likely than principals of non-family firms to constrain CEO risk aversion in response to current option wealth.

Hypothesis 1b. Dominant family principals are more likely than principals of non-family firms to constrain CEO risk-seeking in response to prospective option wealth.

1.2.5 The Moderating Role of Firm Vulnerability

The management literature suggests a number of factors that make the firm more exposed to failure if risky strategic decisions lead to disappointing results. These factors include performance relative to historical and social aspirations and probability of bankruptcy. In this section, we argue that the aforementioned family s constraint of CEO risk behavior in response to the incentive alignment system is contingent upon these variables. That is, firm vulnerability

accentuates the family s risk bearing in terms of potential synoptic losses and therefore should augment the predicted constraint of CEO risk aversion or risk-seeking.

Historical and social aspiration attainment. There is a long tradition in behavioral research suggesting that firms engage in "problemistic search" when they fail to reach aspirations, which is often portrayed as the negative difference between a firm s current performance and its performance in the past (historical gap) and/or the performance of competitors (social gap) (Bromiley and Harris, 2014; Cyert and March, 1963; Greve, 2003; Lant, 1992). Scholars in the strategy literature have applied this tradition to explain firm risk-taking, arguing that negative performance gaps induce firms to take more risks as a form of problemistic search to close the gap (or attainment discrepancy), while an expectation that the firm s performance will exceed aspirations leads to risk aversion to preserve expected gains (Cyert and March, 1963; Fiegenbaum et al., 1996).

We have argued above that the difference between family and non-family constraint of the CEO s risk response to option wealth (current and prospective) is accentuated when the family perceives a greater probability of poor performance or organizational failure that may lead to partial or complete loss of both SEW and financial wealth. This fear of synoptic losses (perceived family risk bearing) should: (1) increase when the attainment discrepancy, or deficit of aspirations over expected performance, rises; and (2) decrease as the performance gap diminishes, or expected performance exceeds aspirations. This in turn would tend to accentuate the predicted effect of Hypotheses 1a and 1b under conditions of a negative performance gap.

> *Hypothesis 2a.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk aversion in response to current option wealth as firm performance declines relative to performance aspirations.

> *Hypothesis 2b.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk-seeking in response to prospective option wealth as expected firm performance declines relative to performance aspirations.

Bankruptcy threat. Bankruptcy threat represents a severe manifestation of the family s vulnerability to catastrophic synoptic losses. CEOs who may lose their job and non-family shareholders who may lose their investments are also vulnerable to the threat of bankruptcy, but

for all the reasons discussed earlier the family is subject to much higher risk bearing because of concentrated ownership, formidable barriers in exiting the firm, and the fact that all of the family s SEW (such as dynastic succession, identification with the firm, and emotional attachment) and probably most of its economic endowment would be irremediably lost if the firm disappeared (Gomez-Mejia et al., 2007, 2011). Even if the firm might eventually restructure and survive in a different form, bankruptcy proceedings mean that control of the firm is given over to creditors and administrators and the family s strong identification with the failed firm will likely lead to family reputation loss; both are important sources of family SEW (Berrone et al., 2012). Inertia as a result of an overly conservative risk posture by the CEO to preserve current wealth is unlikely to reverse the prospects of bankruptcy threat. On the other hand, a more aggressive risk posture by the CEO to pursue prospective wealth might exacerbate the possibility of total firm failure. Thus, a higher threat of bankruptcy is likely to mobilize family principals to closely monitor CEOs to prevent both of these scenarios. This means that the predictions of Hypotheses 1a and 1b should hold stronger at higher rather than lower levels of bankruptcy threat:

> *Hypothesis 3a.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk aversion in response to current option wealth at higher levels of bankruptcy threat.
>
> *Hypothesis 3b.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk-seeking in response to prospective option wealth at higher levels of bankruptcy threat.

1.2.6 The Moderating Role of CEO Characteristics

We now examine two CEO characteristics that we believe are most likely to influence the extent to which the dominant family owner intervenes to restrain the CEO s risk-taking response to the incentive system, namely CEO tenure and the presence of blood ties between the CEO and the family principals.

CEO tenure. The literature on managerial entrenchment suggests that longer-tenured CEOs have more power to pursue their personal agenda and are less likely to be terminated for disappointing performance results (e.g., Shleifer and Vishny, 1989; Surroca and Tribó, 2008). Hence, these CEOs may exert their influence to respond to stock options as they see fit, acting more

conservatively to preserve current wealth and taking bolder actions to pursue prospective wealth. As per our previous arguments, both of these alternatives increase the family s risk bearing given the family s greater sensitivity to strategic conservatism and aggressiveness. At the same time, the family may consider that they are losing control of their firm as the longer-tenured CEO becomes increasingly assertive within the firm, creating further incentive for constraining CEO decision-making. Thus, the family may react to longer CEO tenure by asserting its control over long-tenured CEOs to prevent risk aversion or risk-seeking in response to stock options. Hence:

> *Hypothesis 4a.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk aversion in response to current option wealth at higher levels of CEO tenure.
>
> *Hypothesis 4b.* Dominant family principals are more likely than principals of non-family firms to constrain CEO risk-seeking in response to prospective option wealth at higher levels of CEO tenure.

CEO family ties. Within family firms, we expect family CEOs to automatically fall into line with the risk preferences of the broader family group, given that they themselves form part of the dominant coalition with concentrated firm-specific risk bearing that leads to constraint of CEO risk behavior. As a result of their family ties and in return for their service to the family, these family CEOs enjoy job security and the SEW benefits of identification, emotional satisfaction, and binding social ties to the power elite (Berrone et al., 2012; Gomez-Mejia et al., 2001, 2003; Kets de Vries, 1993). Because of their symmetrical risk preferences with and loyalty to their family, we expect self-regulation by family CEOs, meaning that the risk response to equity incentives is self-constrained. Thus,

> *Hypothesis 5a.* Family CEOs are more likely than non-family CEOs to self-regulate risk aversion in response to current option wealth.
>
> *Hypothesis 5b.* Family CEOs are more likely than non-family CEOs to self-regulate risk-seeking in response to prospective option wealth.

1.3 Methods

1.3.1 Data

To test our hypotheses we extract data from five separate independent sources for the period 2004 through 2011: Execucomp, Compustat, Corporate Library, Option Metrics, and annual proxy statements published by the U.S. Securities and Exchange Commission (SEC). We include in the analysis only the publicly traded companies from the manufacturing sector (SIC code from Compustat with values between 2000 and 4000) to ensure the relevance of the measures of strategic risk-taking, as described below (Devers et al., 2008; Martin et al., 2013; Miller and Bromiley, 1990). In total, we test our hypotheses on a sample of 504 companies and 1,989 firm years, over a period of 8 years.

1.3.2 Measures

CEO strategic risk-taking. In order to obtain our measure of CEO strategic risk-taking, consistent with prior behavioral agency research examining agent and firm risk-taking, we calculate a single factor using three variables that have been positively associated with firm risk: R&D expenditures, long-term debt, and capital expenditures (CAPX) (Devers et al., 2008; Martin et al., 2013). Factor analysis shows that the single factor explains 70.1% of the total variance, while the values for the factor loading are 0.86 for long-term debt, 0.81 for R&D expenditures, and 0.84 for capital expenditures. The factor is standardized.

Family control. Following the Corporate Library s definition, family control is measured as a dummy variable taking the value 1 if the firm is family-controlled (88 firms, for 227 firm years) and 0 otherwise (416 firms, for 1,771 firm years). A family-controlled firm is defined by the Corporate Library as “a company where family ties, most often going back a generation or two to the founder, play a key role in both ownership and board membership. Family members may not have full control of the shareholder vote (greater than 50%) but will generally hold at least 20%.” The fact that half the CEOs in firms coded as 1 are from the controlling family (as identified through proxy statements, an independent data source) lends credence to the Corporate Library s categorization (more on this later). A dichotomous measure of family control has been used in numerous family business studies (e.g., Allen and Panian, 1982; Berrone et al., 2010; Gomez-Mejia et al., 2003; Schulze et al., 2001). Also, the 20% cutoff used by the Corporate

Library should be interpreted in light of a long stream of research on control of large publicly traded firms as well as SEC reporting requirements that use an ownership threshold as low as 5% to proxy a principal s capacity to exert major influence over the firm s affairs (e.g., Feldman et al., 2013; Hambrick and Finkelstein, 1995; McEachern, 1975; Salancik and Pfeffer, 1980). Lastly, a recent study of the entire population of Swedish firms by Gomez-Mejia and colleagues (2014) reveals that both a family dummy and a continuous family ownership measure correlate in the mid 0.90s with other indicators of family influence such as the composition of the top management team, number of relatives working for the firm, and intergenerational transitions.

Current wealth. The variable current wealth measures the potential for option wealth loss in the CEO s mixed gamble (that is, one with prospective gains and losses). Current wealth is calculated using the number of options from each option grant, multiplied by their corresponding spread (market price minus exercise price) on the final day of the fiscal year for unexercisable and exercisable options (Martin et al., 2013). Options are exercisable if the CEO has taken ownership of them (typically after four years of receiving them), yet both exercisable and unexercisable options are believed to be endowed by CEOs, meaning it will add to their risk bearing (Wiseman and Gomez-Mejia, 1998).

Prospective wealth. The variable prospective wealth is an estimate of the potential for option wealth gains in the CEO s mixed gamble and it represents the potential future increase in CEO option wealth due to successful risk-taking leading to increases in the price and value of CEO stock options, over and above the current cash value of the stock options (current wealth). Data for both current wealth and prospective wealth are obtained from Execucomp. Consistent with Martin and colleagues (2013), the formula used for computing prospective wealth is:

$$\text{Prospective wealth} = \text{Number of Options Held} \times [(1.053^{\text{time}} \times \text{Stock Price}) - \text{Stock Price}] \quad (1)$$

The *number of options held* by the CEO (in the prospective wealth calculation) represents the sum of the number of exercisable and unexercisable options; *time* represents a weighted average of the time to expiry of the exercisable, unexercisable, and new grants options and is computed after the steps proposed by Core and Guay (2002); and *stock price* represents the price of company s stock options at the end of the fiscal year. We estimate potential future increases in the value of stock options due to successful risk-taking using the average annual increase in the Dow Jones index over the period of data analysis, which is 5.3% (Martin et al., 2013).

Performance relative to historical aspiration and *performance relative to social aspiration.* Financial performance is measured as the firm s return on assets (ROA). Historical aspiration uses the focal firm s previous performance (*t-2*) as a proxy for performance aspirations, while social aspiration uses industry performance (*t-2*) to estimate aspirational performance (for which we used the performance of the median firm in the same four-digit SIC code) (Chrisman and Patel, 2012). Historical and social performance discrepancies are calculated as the difference between aspirations and the firm s performance in year *t−1* (Dyer and Miller, 2008). The logic being that the firm will assess at the end of year *t-1* the need for problemistic search (based on whether the performance in that year met aspirations or not) and take risk in year *t* if that problemistic search is deemed necessary.

Bankruptcy threat. We estimate bankruptcy threat based on the Altman s Z value (Altman, 1983), which is used to predict the probability of firm bankruptcy within two years. The formula for computing the Altman s Z is the following:

$$Z = 1.2T_1 + 1.4T_2 + 3.3T_3 + 0.6T_4 + 0.999T_5,$$

where T_1 represents the firm s working capital divided by total assets, T_2 is the firm s retained earnings divided by total assets, T_3 represents the firm s earnings before interest and taxes divided by total assets, T_4 is the market value of equity divided by total liabilities, and T_5 is the firm s sales divided by total assets. The lower the value of the Altman Z, the greater the bankruptcy threat. In order to ensure that our bankruptcy measure is positively related to bankruptcy, we calculate the variable as 1 divided by the Altman Z value.

CEO tenure. We measure CEO tenure as the duration of CEO employment with the firm at the end of the reporting year (extracted from the Execucomp database).

Family CEO. Family CEO is a dummy variable taking the value 1 if the CEO is member of the family owning the firm (founder or next-generation family member) and 0 otherwise. Family CEOs are those who are related to family owners; these are manually identified through yearly proxy statements published by the SEC. Again, using this independent source, we find that 48% of all firms classified by the Corporate Library as “family controlled” also had a family CEO, corroborating the validity of the Corporate Library s classification. Out of this total

number of family CEOs, 81% are also founders or co-founders and only 19% are family descendant CEOs.

Control variables. Consistent with prior studies of firm risk-taking, we include several control variables: *firm size* as the natural logarithm of firm´s total assets in the reporting year, *stock price volatility* as the standard deviation of firm´s stock price over the previous 3 years, *prior industry diversification* (Hitt et al., 1997; Gomez-Mejia et al., 2010), *CEO salary* as the fixed component of CEO´s pay, the *value of shares owned* by the CEO, *CEO age*, *CEO duality* as a dummy recorded as 1 in situations where the CEO is also the board chairman and 0 otherwise, *CEO hedging* as a dummy recorded as 1 where the firm trades put options and 0 otherwise, *CEO vulnerability* which is a dummy variable recorded as one if the firm has reported three consecutive years of decreases in both share price and return on assets, and zero otherwise (Martin et al., 2013), and *year dummies*. In the main regression models we also control for *firm performance* (using ROA), *bankruptcy risk* and *CEO tenure*. Note that we don´t include firm performance in the models testing historical and social discrepancy as firm performance is part of the aforementioned discrepancy variables. Some studies include the firm s family stage as a variable of interest given that the family s influence may wane in the second or third generations (e.g., Schulze et al., 2001; Gomez-Mejia et al., 2007). In our case, CEO family ties capture the generational effect, as the vast majority of family CEOs are founders or co-founders. By implication, family firms with non-family CEOs tend to be in later family stages and, consistent with our logic, the family influence in restricting the CEO should diminish accordingly. However, when we test our family CEO hypothesis, we use only family firms in the sample and create a variable that is coded as 1 when there is a family CEO and 0 otherwise.

1.3.3 Analysis

We winsorize our data at the 1% level to control for extreme outliers. Furthermore, we standardize our variables with a mean of 0 and standard deviation of 1. Because we are using panel data in our model we use the Hausman test to assess whether fixed effects and random effects influenced the data (Certo and Semaden, 2006). Our significant results (*p-value* < 0.001, $X^2 = 106$) indicate the need to use a fixed effects model. We run the regressions using the *xtreg* function from STATA, with the *fe* (fixed effects) option.

1.4 Results

1.4.1 Empirical Results

Table 1.1 shows the *descriptive statistics* (mean and standard deviation before being standardized) and the *correlation matrix*. Tables 1.2–1.4 (total sample) and Table V (family sub-sample) contain the results of the regression models with strategic risk-taking as the dependent variable. Our graphs of the interaction effects use percentiles to reflect the low (25^{th} percentile) and high (75^{th} percentile) values of the moderator variables. As shown in Table 1.2, prospective wealth and current wealth are significant and in the directions previously theorized by BAM (leading to CEO risk-seeking and CEO risk aversion respectively) in the main effects model. In the interactions model (Model 3, Table 1.2), current wealth s interaction with family ownership is significant and positive (0.04) at $p < 0.05$; that is, the negative effect of CEO risk bearing upon CEO risk aversion is attenuated when there is a dominant family owner (for a graphic representation, see Figure 1A). This provides support for Hypothesis 1a s prediction that family principals are more likely than non-family principals to constrain CEO risk aversion in response to their current wealth. Supporting Hypothesis 1b, family ownership also constrains CEO prospective wealth s positive effect upon CEO risk-seeking; family ownership constrains risk-taking by CEOs (the interaction coefficient of −0.05, at $p < 0.01$, significantly constrains the main effect coefficient of 0.05, at $p< 0.001$, Table 1.2, Models 2 and 3) in response to their prospective wealth when predicting strategic risk-taking (see Figure 1B).

Hypothesis 2a predicts that, when firm performance declines relative to historical and social aspirations, dominant family principals are more likely than their non-family counterparts to constrain CEO risk aversion in response to current wealth. Hypothesis 2a is confirmed by the regression results when firm performance is below social aspirations (for a graphic representation, see Figure 1C). Family ownership s interaction with current wealth is significant ($b = 0.09$, $p < 0.05$) and positive for the below-median sample (when the firm is less likely to have achieved aspirational performance) and not significant for the above-median sample (Table 1.3, Model 3). That is, the family firm appears more concerned with constraining CEO risk aversion when the firm is less likely to have achieved performance aspirations. Hypothesis 2b is supported for social aspiration discrepancy as the coefficient for the interaction between CEO prospective wealth and family control is negative and significant in the below-median models (b

= −0.10, p < 0.01, Table 1.3, Model 3) but insignificant in the above-median models (for a graphic representation, see Figure 2D). It follows that family principals are more likely than non-family principals to constrain both risk-averse (as per Hypothesis 2a) and risk-seeking CEO behaviors (as per Hypothesis 2b) in response to current and prospective wealth, respectively when firm performance falls below social aspirations. Hypotheses 2a and 2b are not supported for the case of historical discrepancy as the interaction coefficients are not significant for the above-median sample for current wealth and are significant for both above and below median samples in the case of prospective wealth.

Family principals´ constraining of CEO risk-taking (risk aversion to preserve current wealth and risk-seeking to pursue prospective wealth) is predicted to be greater under conditions of higher bankruptcy threat by Hypotheses 3a and 3b (Figures 1E and 1F). Hypothesis 3a is strongly supported by the direction and significance of coefficients of the interaction terms in the higher bankruptcy threat models (b = 0.04, p < 0.001), along with the absence of significance of these interactions in the low bankruptcy threat models (Table 1.4, Models 1 and 2). Family ownership interacts negatively with prospective wealth (b = −0.01, p < 0.001) and is insignificant in the low bankruptcy threat model, which supports Hypothesis 3b (Table 1.4, Models 1 and 2).

The impact of longer CEO tenure relative to shorter CEO tenure on the family principals´ constraint of CEO risk-taking in response to their option wealth (current and prospective), as predicted by Hypotheses 4a and 4b, is captured in Table 1.4, Models 3 and 4. Hypothesis 4a is supported by a positive and significant coefficient of interaction (b = 0.06, p < 0.01) in the above-median tenure model and no significance for the equivalent interaction in the below-median sample, which supports Hypothesis 4a (see Figure 1G). Similarly, Hypothesis 4b is supported by the fact that (1) family ownership interacts negatively with prospective wealth (b = −0.11, p < 0.001), suggesting that family principals constrain CEO risk-seeking in response to prospective wealth when there are higher CEO tenure levels (see Figure 1H); and (2) the equivalent interaction is not significant in the below median sample. That is, our results provide strong support for the prediction that family principals are more likely to constrain CEO risk behavior when the CEO is longer tenured.

Model 3 in Table 1.5 tests Hypotheses 5a and 5b. Please note that the sample used for this empirical test differs from that used for prior testing, given that we now use only the sub-sample

of family firms to see if the family CEO (a dummy variable) effect is stronger than for non-family CEOs, and thus whether the family CEO self-regulates, as suggested by our theory. Hypothesis 5a is not supported, as risk-averse response to current wealth does not differ by family CEO status. Hypothesis 5b predicts that family control will have a greater attenuating effect on the relationship between CEO prospective wealth and strategic risk-taking when the CEO is a family member; this is strongly supported, as reflected by the negative ($b = -0.10$, $p < 0.001$) coefficient for the two-way interaction of the family CEO dummy with prospective wealth in Table 5, Model 3, which significantly constrains the main effect of CEO prospective wealth (for a graphic representation, see Figure 1I). It follows that in firms with a dominant family owner, family CEOs will be less inclined to make egocentric, higher-risk strategic decisions aimed at increasing their prospective option wealth.

1.4.2 Robustness Tests

We conduct additional analyses to check the robustness of our results across different model specifications. We use a two-stage least squares (2SLS) regression model to control for the endogeneity of our independent variables (current wealth, and prospective wealth) in our models predicting risk taking. We use the lag of both current and prospective wealth as instrumental variables for each of current and prospective wealth. We test the validity of the instruments with the value of the F-statistic and the significance of the instrumental variables predicting the endogenous variables (current wealth and prospective wealth), followed by the evaluation of the Sargan-Hansen test of overidentification to account for their exogeneity (Martin et al., 2013). The F-statistic in the first-stage analysis of 2SLS and the Sargan-Hansen test are both within the bounds of acceptability for most of our models. The exception was that the interaction coefficients corresponding to historical aspiration were significant for both the above and below median splits. We also conduct a robustness test using a dependent variable calculated as the addition of standardized R&D expenditures, capital expenditures, and long-term debt. The results of the corresponding regression models using the alternate dependent variable are substantially the same as those presented below.

1.5 Discussion and Conclusions

Our study aims to examine the effect of ownership structure—specifically, the constraining effect of family ownership—on managerial agents (or CEOs) risk-taking behaviors in response to an option-based incentive alignment plan. To do so, we combine behavioral agency research examining agent risk-taking and family firm research examining family principals´ risk preferences relative to non-family principals. Our findings demonstrate that family ownership constrains: (1) the negative risk bearing (current wealth) effect on CEO strategic risk-taking, and (2) the positive prospective wealth effect upon CEO strategic risk-taking. In addition, our findings suggest that the family s restraint of CEO risk aversion and CEO risk-seeking is a positive function of the family s exposure to what we call synoptic losses, or losses in the family s combined SEW and economic endowment embedded in the firm. These findings make important theoretical and practical contributions to both literatures, which we expand upon below.

The field of behavioral agency in the management literature has sought to enhance the predictive validity of models that forecast agent risk-taking. For example, BAM has drawn upon behavioral decision research, such as the concept of loss aversion from prospect theory, to allow us to understand how equity-based pay influences agent risk-taking (c.f., Denya et al., 2005). Recent refinements in this field also demonstrate that prospective wealth may incentivize agents to take greater risk, acting as a separate heuristic that coexists with the concepts of loss aversion and risk bearing (Martin et al., 2013). What this theory currently lacks is an appreciation of the role of principal risk bearing in this process. Our study underlines the importance of the dominant principal s risk preferences in restraining and shaping agents risk-taking efforts, for example in limiting or acquiescing to the motivational effect of the incentive system.

We show that family firms are not consistently more risk-averse than non-family firms when it comes to their preferences for agents´ strategic choices (a generally accepted premise in much of the family business literature; c.f., Anderson and Reeb, 2003; Fan and Wong, 2002; Gomez-Mejia et al., 2001, 2010). On the contrary, our findings suggest family firms that have constrained CEO risk aversion (due to the family principals being uncomfortable with the threat posed by risk aversion) will have higher levels of risk than non-family firms that have CEOs with similar levels of current wealth. At the same time, family firms whose CEOs have high

prospective wealth, will be more risk-averse than non-family firms whose CEOs have the same levels of prospective wealth. Thus, our findings advance our understanding of family firm risk preferences relative to non-family firms by considering the risk preferences of the managerial agent and the family principals´ constraints upon agent risk-taking in response to stock options. Further, differences in family and non-family firm risk-taking is contingent upon the family s vulnerability to synoptic losses (as reflected by failure to achieve performance aspirations or higher bankruptcy threats), meaning that family principals are more likely to acquiesce in CEO risk responses to stock options at lower levels of vulnerability. Thus, family and non-family firm risk preferences are more likely to converge at lower levels of family principals´ vulnerability to loss.

Our study also contributes to the literature that provides an institutional explanation for the adoption of certain corporate governance practices, such as long-term income plans, that are consistent with a prevailing "agency logic" (Zajac and Westphal, 1994; Westphal and Zajac, 1995). Family firms are not immune to institutional pressures if they wish to attract and retain competent CEOs who may have alternative employment opportunities. In fact, we found no difference in the distribution of this type of incentive plan in our population of firms by family ownership status. Our theory indicates that family principals may adopt equity-based incentive plans for CEOs both substantively (when there is alignment of risk preferences) and symbolically (when there is misalignment of risk preferences). This refines previous research which documented the symbolic adoption of equity incentives—that is, the failure to actually use incentives despite the firm s apparent embrace of them—and attributed it to the opportunistic use of CEO power (c.f., Zajac and Westphal, 1994). Our results show that the firm s principals influence the extent to which incentives are substantively or symbolically embraced. That is, when agent and principal risk preferences are aligned, firm principals tend not to constrain the behavioral effects on the CEO after the incentives are adopted, reflecting substantive use of equity-based pay. Conversely, when risk preferences are misaligned, the adoption of equity-based pay appears more symbolic, as reflected by deviation from BAM s predictions due to principals´ constraining behavior (greater limitations are placed on CEO risk-taking when the family principal is more vulnerable to losses). In other words, family owners of publicly traded firms appear to enjoy the legitimacy that comes from adopting a ubiquitous governance

mechanism, but when their risk bearing is higher, adoption of this governance mechanism appears to be—at least relative to non-family firms—neutralized in practice.

At the firm level, our findings show that the family looks vigilantly for cues regarding the heightened probability of family synoptic losses as a result of CEO risk-taking (or lack thereof). These cues come in various forms, including solvency and performance relative to aspirations. When family principals are more vulnerable, they are more likely to constrain CEO risk aversion and risk seeking. Interestingly, when this prediction is not supported, it is more likely regarding CEO risk aversion, suggesting that family principals are more vigilant with regard to risk-seeking than risk aversion. At the CEO level, our findings show that family CEOs are stewards of the family principals and therefore are more likely to self-regulate, or make strategic decisions that shield the family from synoptic losses, and less likely to make egocentric strategic decisions aimed at increasing their prospective option wealth.

To our knowledge this is the first study that bridges BAM s research on CEO risk-taking with BAM s research on firm risk-taking driven by ownership configuration. Concerning the special case of family firms, Chrisman and Patel (2012: 977) note that "prior studies indicate that family firms will embrace risky decisions that preserve socioemotional wealth even if they are expected to decrease long term economic wealth, yet also avoid risky decisions that might increase long term economic wealth but reduce socioemotional wealth." This discourse has not considered the role of CEO incentives, which takes center stage in most of the corporate governance literature dealing with firm risk-taking, including those based on BAM (e.g., Devers et al., 2008; Larraza-Kintana et al., 2007; Sanders, 2001; Martin et al., 2013). We address this issue directly in the context of family firms. By offering the CEO options, while at the same time monitoring the CEO to ensure that the family firm adopts a risk posture less likely to expose the family to synoptic losses, the family principal reconciles the need to preserve SEW with long-term economic welfare. This approach to designing a "pay mix" for CEOs also helps the family firm comply with prevailing corporate governance practices, with its attendant benefits (for instance, making competitive offers to potential CEO candidates, gaining positive market reactions, and winning the approval of current and potential investors).

This study also makes important contributions to our understanding of agency costs as a function of ownership structure. Agency and family firm research examining agency problems

unique to family firms has provided conflicting arguments regarding the implications of family ownership for agency costs. Some scholars have argued that concentrated ownership leads to more intense monitoring, reducing the agency costs associated with opportunistic agent behavior (Jensen and Meckling, 1976). However, others have made a strong case that family ownership is associated with unique types of agency costs, such as family altruism and entrenchment of family employees tainting hiring and firing decisions (Schulze et al., 2001) and other forms of expropriation from minority shareholders (Fan and Wong, 2002). Our findings contribute to this discourse by demonstrating that family ownership may reduce shareholder agency costs by neutralizing the effect of principal-agent incentive alignment mechanisms through constraining CEO risk responses (risk aversion or risk-seeking) to option wealth. That is, per our theory the family principals´ restriction of CEOs risk aversion (to protect their accumulated option wealth) or CEO risk seeking (in pursuit of further wealth) should alleviate agency costs (see, for example, the literature we cited suggesting that both risk aversion and risk-seeking can have adverse firm performance effects [Sanders and Hambrick, 2007]). These findings provide a new perspective from which to consider the implications of family ownership for the unique nature of agency problems and associated costs within family firms relative to non-family firms.

The fact that family firms are not consistently more risk-averse or risk-seeking than non-family firms (contingent upon family vulnerability to synoptic loss) might also help explain some of the reasons why the evidence is unclear as to the effect of family ownership on firm performance. Several comprehensive literature reviews (e.g., Gedajlovic et al., 2012; Sacristan-Navarro et al., 2011), meta-analyses (Carney et al., 2011; van Essen et al., 2011), and a series of papers by Villalonga and colleagues (Amit and Villalonga, 2014; Villalonga and Amit, 2006, 2009, 2010) conclude that as a whole family control has some positive impact on performance, although various factors may offset (e.g., dual class stock) or augment (e.g., founder-led firms) the positive performance effect of family control. Consistent with the position of Gomez-Mejia and colleagues (2011: 704), our results suggest that in family businesses, the positives of close monitoring (preventing lower risk-taking by CEOs to protect their accumulated option wealth) coexist in a tenuous balance with the negatives (e.g., the inability of CEOs to take higher risks that might concurrently increase their equity wealth and the value of the overall portfolio of diversified shareholders; Hill and Snell, 1988; Nyberg et al., 2010).

In light of the recent financial crisis, the constraining effect of family ownership on CEOs´ ability to take additional risks (that is, limiting the effect of CEO prospective wealth on risk-taking) may be considered socially desirable, contrary to the tenets of agency theory. Many prominent public figures (including U.S. President Barack Obama, members of the U.S. Congress, and the head of the European Union) have attributed the financial crisis to careless risk-taking by executives motivated by personal enrichment. Our study provides the important insight that family firms are more likely to minimize this type of agency cost. This is a valuable insight for investors aiming to avoid firms with a greater risk of indulging in the excessive risk-taking regulators have criticized as partly responsible for the crisis.

1.6 Limitations and Future Directions

As with most studies, ours is subject to some limitations. Our sample is limited to publicly listed firms due to the databases we have access to. We also use a single and binary measure of family firm categorization from the Corporate Library database (20% threshold for family ownership). However, there is no clear consensus regarding the threshold necessary to indicate family ownership, and 20% is more conservative than the standard used in most prior studies of publicly traded companies (Berrone et al., 2010). Furthermore, as noted earlier, half of the CEOs in these firms are family members, supporting the validity of the family classification. We measure the control aspect of SEW inferentially given that this is a conceptual construct that is purportedly more salient for family principals and not amenable to direct observation via archival data. This application is very similar to the use of such widely known concepts as transaction costs, tacit knowledge, technological intensity, marginal productivity, risk bearing, and the like that are measured at best through very indirect proxies, an unavoidable compromise in the absence of behavioral data.

We restrict our measures of equity wealth to stock options. This is because: (1) stock options continue to be ubiquitous in CEO pay at publicly listed firms, and now exceed more than two-thirds of the typical CEO s compensation package (Nyberg et al., 2010; Martin et al., 2013); (2) the majority of BAM literature has focused on the role of stock options (and the associated heuristics) in influencing CEO behavior and agency costs (Devers et al., 2008; Martin et al., 2013); and (3) stock options are likely to have a stronger effect on CEO behaviors than other forms of CEO wealth due to the more extreme sensitivity of stock options to share price

movements (Sanders, 2001). Future studies could look at how family ownership affects the behavioral influence of other forms of CEO firm-specific wealth.

Lastly, this study raises a fascinating question for future research: Why would a non-family candidate for a CEO position be willing to accept the top job at a family firm given the constraining forces discussed in this paper? One reason we can rule out is that these non-family CEOs receive higher overall compensation than other similarly situated CEOs in non-family firms (Gomez-Mejia et al., 2003) or that family firms avoid offering CEOs equity-based pay (we found no evidence for this). We can only speculate as to other plausible reasons. First, the non-family CEO may be attracted to a family firm for reasons that are not extrinsic in nature (for instance, an organizational culture characterized by "familiness" and a positive image in the community; see Berrone et al., 2010). Second, the non-family CEO may enjoy higher employment security in a family firm as long as the CEO bows to the desires of the dominant family owner. Third, the CEO may be part of an extended family network even if the CEO is not formally a family member. Fourth, family firms prefer to appoint internal candidates as CEOs (note that 81% of the CEOs in our population of family firms are insiders versus 58% in non-family firms), which may induce gratitude to the family and make the CEO more prone to accept family constraints on his/her discretion. Lastly, although family firms provide the CEO with less autonomy, the compensation packages they offer may still be sufficiently attractive to lure and retain high-quality candidates; in fact, there is a huge variance in CEO compensation, and on average less than 5% of that variance may be attributed to firm performance (as per meta analysis by Tosi and colleagues [2000]).

1.B Tables

TABLE 1.1

Descriptive Statistics and Correlation Matrix

	Variables[a]	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Strategic risk-taking	0.03	0.98																		
2	Current wealth	12,183	23,735	0.15																	
3	Prospective wealth	72,558	138,661	0.31	0.36																
4	Family control	0.11	0.32	-0.09	0.05	0.07															
5	Bankruptcy threat	0.00	0.00	-0.18	-0.16	-0.14	0.04														
6	Historical discrepancy	0.01	0.12	-0.01	0.00	0.00	0.01	-0.07													
7	Social discrepancy	0.01	0.05	0.01	-0.00	0.00	-0.01	-0.05	0.41												
8	CEO tenure	6.82	6.21	-0.09	0.19	0.10	0.31	0.01	-0.01	0.00											
9	Family CEO	0.06	0.24	-0.08	0.04	0.09	0.70	0.04	0.01	0.00	0.45										
10	Firm size	7.54	1.54	0.66	0.29	0.34	-0.15	-0.51	0.00	0.02	-0.15	-0.15									
11	Performance	0.04	0.11	0.11	0.20	0.12	-0.05	-0.45	0.09	0.05	0.03	-0.04	0.26								
12	Stock price volatility	7.38	6.32	-0.02	0.31	0.13	-0.02	-0.22	-0.04	-0.05	-0.03	-0.01	0.25	0.18							
13	Firm diversification	0.93	0.73	0.20	0.05	0.06	-0.13	-0.21	-0.01	-0.01	-0.12	-0.09	0.44	0.11	0.13						
14	CEO salary	6.58	0.42	0.48	0.27	0.36	-0.10	-0.41	-0.00	0.01	-0.06	-0.09	0.81	0.22	0.27	0.39					
15	CEO shares	29,590	52,821	0.24	0.44	0.41	0.16	-0.18	-0.01	-0.02	0.31	0.20	0.31	0.16	0.13	0.06	0.29				
16	CEO age	55.45	6.41	0.07	0.08	0.04	0.03	0.01	-0.02	-0.01	0.40	0.12	0.05	0.02	0.02	0.14	0.11	0.11			
17	CEO duality	0.50	0.50	0.15	0.09	0.10	-0.16	-0.12	-0.05	-0.03	0.13	-0.09	0.28	0.09	0.11	0.18	0.32	0.11	0.23		
18	CEO hedging	0.93	0.25	0.10	0.08	0.03	-0.03	-0.34	0.01	0.02	-0.09	-0.04	0.26	0.14	0.13	0.08	0.18	0.10	-0.10	0.04	
19	CEO vulnerability	0.10	0.29	-0.04	-0.09	-0.03	0.02	0.15	-0.36	-0.23	0.03	0.02	-0.09	-0.15	-0.03	-0.01	-0.06	-0.03	0.02	-0.02	-0.03

N = 1,989

* Correlations with an absolute value greater than 0.03 are significant at $p < 0.05$.

[a] Variables 2, 3 and 15 are expressed in thousands. Variable 10 is expressed in millions. Firm size was measured as the natural logarithm of firm sales. Performance was measured as ROA.

TABLE 1.2
Regression Models Predicting Strategic Risk-Taking: Family Moderator

	Control Variables		Main Effects		Family Control Interaction	
	Model 1		Model 2		Model 3	
Independent Variables	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***
Firm size$_{t-1}$	0.28***	(0.04)	0.28***	(0.04)	0.27***	(0.04)
Performance$_{t-1}$	-0.00	(0.01)	-0.00	(0.01)	-0.00	(0.01)
Stock price volatility$_{t-1}$	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)
Firm diversification$_{t-1}$	0.01	(0.02)	0.02	(0.02)	0.02	(0.02)
CEO salary$_{t-1}$	-0.01	(0.02)	-0.00	(0.02)	-0.00	(0.02)
CEO shares$_{t-1}$	0.03***	(0.01)	0.02*	(0.01)	0.02*	(0.01)
CEO age$_{t-1}$	0.02	(0.01)	0.02	(0.01)	0.02	(0.01)
CEO duality$_{t-1}$	-0.02	(0.02)	-0.02	(0.02)	-0.03	(0.02)
CEO hedging$_{t-1}$	-0.08*	(0.04)	-0.07	(0.04)	-0.07	(0.04)
CEO vulnerability$_{t-1}$	-0.02	(0.02)	-0.02	(0.02)	-0.02	(0.02)
Bankruptcy risk$_{t-1}$	0.01	(0.02)	0.01	(0.02)	0.01	(0.02)
CEO tenure$_{t-1}$	-0.01	(0.02)	-0.01	(0.01)	-0.00	(0.01)
Family control	-0.06	(0.04)	-0.06	(0.04)	-0.06	(0.04)
CEO family	0.00	(0.05)	-0.01	(0.05)	0.00	(0.05)
CEO current wealth$_{t-1}$			-0.03***	(0.01)	-0.04***	(0.01)
CEO prospective wealth$_{t-1}$			0.05***	(0.01)	0.06***	(0.01)
Family control X CEO current wealth$_{t-1}$					0.04*	(0.02)
Family control X CEO prospective wealth$_{t-1}$					-0.05**	(0.02)
Constant	0.02	(0.04)	0.02	(0.04)	0.02	(0.04)
R squared (within)	0.14		0.17		0.17	
R squared (between)	0.44		0.44		0.44	
R squared (overall)	0.14		0.17		0.17	
N	1,989		1,989		1,989	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05.
Please note that the change in R squared for main effects and interactions models is significant at p <0.05.
Year dummies are included in the regressions but not listed in this table.

TABLE 1.3
Regression Models Predicting Strategic Risk-Taking:
Attainment Discrepancy Median Split

	HISTORICAL DISCREPANCY				SOCIAL DISCREPANCY			
	Below median		Above median		Below median		Above median	
	Model 1		Model 2		Model 3		Model 4	
Independent Variables	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***
Firm size$_{t-1}$	0.36***	(0.08)	0.18**	(0.07)	0.22**	(0.08)	0.21***	(0.06)
Stock price volatility$_{t-1}$	-0.02	(0.01)	-0.01	(0.01)	-0.01	(0.01)	0.00	(0.01)
Firm diversification$_{t-1}$	0.02	(0.03)	0.04	(0.03)	0.02	(0.03)	0.02	(0.02)
CEO salary$_{t-1}$	-0.02	(0.03)	0.02	(0.03)	-0.03	(0.03)	0.03	(0.03)
CEO shares$_{t-1}$	0.02	(0.01)	0.03*	(0.01)	0.01	(0.01)	0.04**	(0.01)
CEO age$_{t-1}$	0.06*	(0.02)	-0.01	(0.02)	0.04	(0.02)	-0.02	(0.02)
CEO duality$_{t-1}$	-0.07*	(0.03)	0.00	(0.03)	-0.04	(0.03)	0.02	(0.03)
CEO hedging$_{t-1}$	-0.03	(0.06)	-0.07	(0.07)	-0.08	(0.07)	-0.06	(0.05)
CEO vulnerability$_{t-1}$	-0.06	(0.03)	-0.04	(0.09)	-0.02	(0.04)	0.00	(0.04)
Bankruptcy risk$_{t-1}$	0.02	(0.03)	0.01	(0.03)	-0.00	(0.03)	0.01	(0.03)
CEO tenure$_{t-1}$	-0.01	(0.03)	0.01	(0.02)	-0.01	(0.03)	0.02	(0.02)
Family control	-0.06	(0.07)	-0.06	(0.07)	-0.08	(0.08)	-0.09	(0.06)
CEO family	0.05	(0.11)	-0.03	(0.08)	0.02	(0.10)	0.07	(0.09)
Historical discrepancy$_{t-1}$	-0.00	(0.02)	-0.03	(0.01)				
Social discrepancy$_{t-1}$					0.00	(0.02)	0.00	(0.01)
CEO current wealth$_{t-1}$	-0.05**	(0.02)	-0.03*	(0.01)	-0.04*	(0.02)	-0.04**	(0.01)
CEO prospective wealth$_{t-1}$	0.09***	(0.01)	0.06***	(0.02)	0.11***	(0.02)	0.02	(0.01)
Family control X CEO current wealth$_{t-1}$	0.00	(0.07)	0.04	(0.03)	0.09*	(0.04)	0.01	(0.03)
Family control X CEO prospective wealth$_{t-1}$	-0.11**	(0.03)	-0.06*	(0.03)	-0.10**	(0.03)	-0.04	(0.03)
Constant	0.07	(0.06)	-0.01	(0.07)	0.06	(0.07)	-0.02	(0.06)
R squared (within)	0.24		0.19		0.20		0.21	
R squared (between)	0.46		0.40		0.43		0.40	
R squared (overall)	0.24		0.19		0.20		0.21	
N	996		993		1,025		964	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year and dummies are included in the regressions but not listed in this table

TABLE 1.4
Regression Models Predicting Strategic Risk-Taking: Bankruptcy Threat and CEO Tenure Median Split

	BANKRUPTCY THREAT				CEO TENURE			
	Below median		Above median		Below median		Above median	
	Model 1		Model 2		Model 3		Model 4	
Independent Variables	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***
Firm size$_{t-1}$	0.72***	(0.10)	0.04***	(0.01)	0.42***	(0.07)	0.24***	(0.07)
Performance$_{t-1}$	-0.01	(0.03)	0.00	(0.00)	-0.01	(0.01)	0.02	(0.01)
Stock price volatility$_{t-1}$	-0.01	(0.01)	0.00	(0.00)	-0.01	(0.01)	0.01	(0.01)
Firm diversification$_{t-1}$	0.03	(0.03)	-0.01	(0.00)	0.01	(0.02)	0.01	(0.03)
CEO salary$_{t-1}$	-0.01	(0.03)	0.00	(0.00)	0.01	(0.03)	-0.03	(0.02)
CEO shares$_{t-1}$	-0.02	(0.01)	0.00	(0.00)	0.05**	(0.02)	-0.02	(0.01)
CEO age$_{t-1}$	0.04	(0.02)	0.00	(0.00)	0.03	(0.02)	-0.04	(0.06)
CEO duality$_{t-1}$	-0.05	(0.03)	0.00	(0.00)	-0.03	(0.03)	-0.05	(0.03)
CEO hedging$_{t-1}$	-0.14	(0.23)	0.00	(0.00)	-0.09	(0.06)	-0.07	(0.06)
CEO vulnerability$_{t-1}$	-0.07	(0.05)	-0.01	(0.00)	-0.04	(0.03)	0.02	(0.03)
Bankruptcy risk$_{t-1}$	1.46*	(0.65)	0.00	(0.00)	0.02	(0.02)	0.01	(0.02)
CEO tenure$_{t-1}$	0.03	(0.03)	-0.00	(0.00)	0.02	(0.04)	0.14	(0.08)
Family control	-0.16*	(0.08)	0.01	(0.01)	-0.02	(0.06)	-0.05	(0.07)
CEO family	0.00	(0.10)	0.01	(0.01)	0.05	(0.12)	-0.02	(0.07)
CEO current wealth$_{t-1}$	-0.03*	(0.01)	-0.04***	(0.00)	0.00	(0.02)	-0.03*	(0.01)
CEO prospective wealth$_{t-1}$	0.08***	(0.01)	0.00	(0.00)	0.04*	(0.02)	0.12***	(0.01)
Family control X CEO current wealth$_{t-1}$	0.04	(0.03)	0.04***	(0.01)	-0.02	(0.08)	0.06**	(0.02)
Family control X CEO prospective wealth$_{t-1}$	-0.01	(0.04)	-0.01***	(0.00)	-0.01	(0.04)	-0.11***	(0.02)
Constant	0.57	(0.35)	-0.34***	(0.01)	0.10	(0.06)	-0.06	(0.07)
R squared (within)	0.27		0.30		0.16		0.22	
R squared (between)	0.54		0.28		0.45		0.44	
R squared (overall)	0.27		0.30		0.16		0.22	
N	998		991		1,116		873	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year and dummies are included in the regressions but not listed in this table.

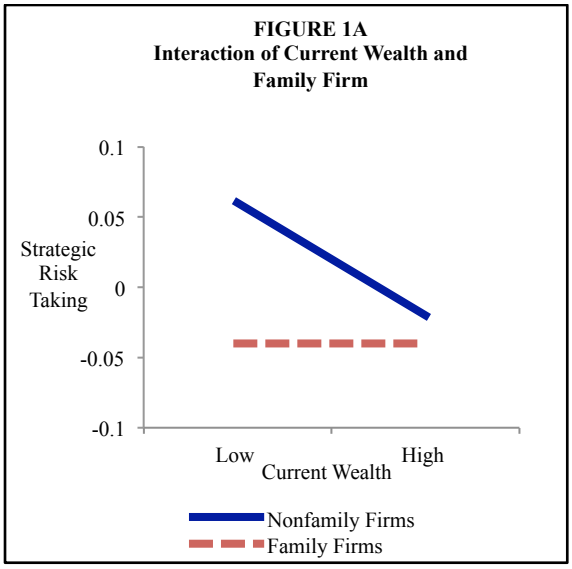
TABLE 1.5
Regression Models Predicting Strategic Risk-Taking in Family Firms

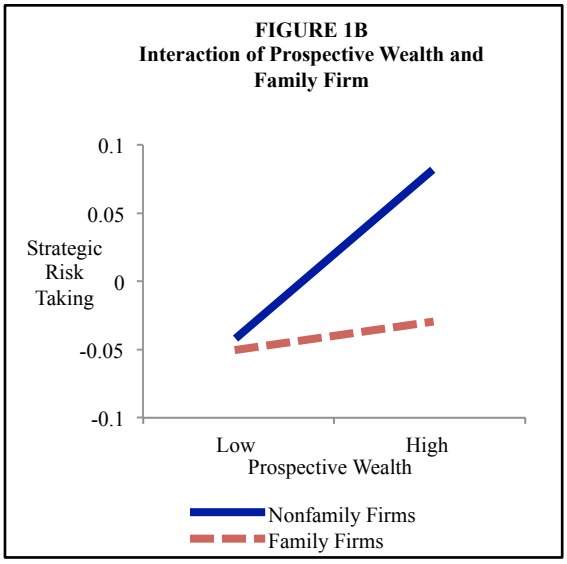
	FAMILY SAMPLE					
	Control Variables		Main Effects		Family CEO	
	Model 1		Model 2		Model 3	
Independent Variables	***Beta***	***S.E.***	***Beta***	***S.E.***	***Beta***	***S.E.***
Firm size$_{t-1}$	0.20**	(0.06)	0.21**	(0.07)	0.17*	(0.06)
Performance$_{t-1}$	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)
Stock price volatility$_{t-1}$	-0.02*	(0.01)	-0.02*	(0.01)	-0.02	(0.01)
Firm diversification$_{t-1}$	0.02	(0.02)	0.02	(0.02)	0.01	(0.02)
CEO salary$_{t-1}$	-0.01	(0.02)	-0.01	(0.02)	-0.01	(0.02)
CEO shares$_{t-1}$	0.04***	(0.01)	0.04***	(0.01)	0.02**	(0.01)
CEO age$_{t-1}$	-0.07***	(0.02)	-0.07***	(0.02)	-0.06***	(0.02)
CEO duality$_{t-1}$	-0.01	(0.02)	-0.01	(0.02)	0.00	(0.02)
CEO hedging$_{t-1}$	-0.05	(0.11)	-0.05	(0.11)	-0.18	(0.10)
CEO vulnerability$_{t-1}$	-0.00	(0.02)	-0.01	(0.02)	-0.00	(0.02)
Bankruptcy risk$_{t-1}$	0.00	(0.01)	0.00	(0.01)	0.00	(0.01)
CEO tenure$_{t-1}$	0.02	(0.02)	0.01	(0.02)	0.01	(0.01)
CEO family	0.03	(0.04)	0.03	(0.04)	0.09**	(0.03)
CEO current wealth$_{t-1}$			-0.01	(0.01)	0.02	(0.03)
CEO prospective wealth$_{t-1}$			0.01	(0.01)	0.09***	(0.02)
CEO family X CEO current wealth$_{t-1}$					-0.03	(0.03)
CEO family X CEO prospective wealth$_{t-1}$					-0.10***	(0.02)
Constant	-0.13	(0.12)	-0.13	(0.12)	-0.09	(0.11)
R squared (within)	0.47		0.47		0.61	
R squared (between)	0.50		0.48		0.53	
R squared (overall)	0.47		0.47		0.61	
N	224		224		224	

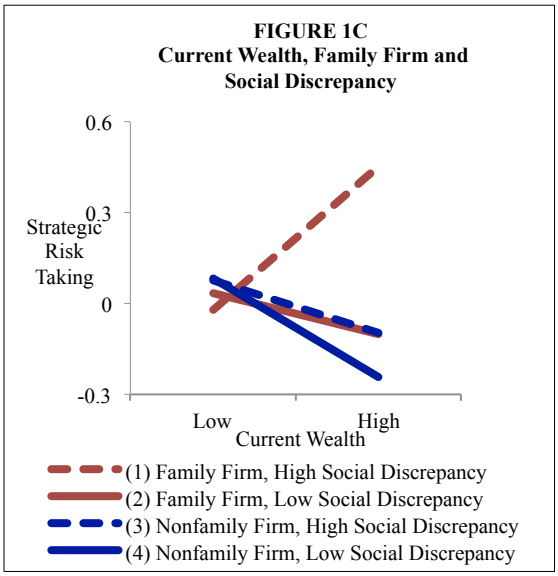
Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year and dummies are included in the regressions but not listed in this table.

1.C Figures

FIGURE 1
Interaction Graphs







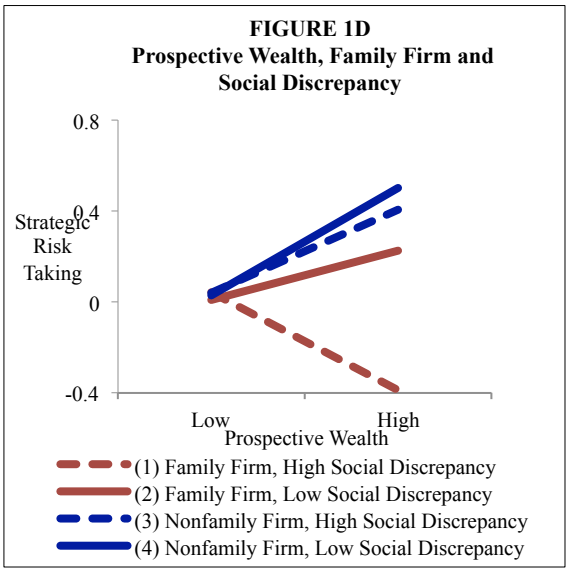


FIGURE 1E
Interaction of Current Wealth, Family Firm and Bankruptcy Threat

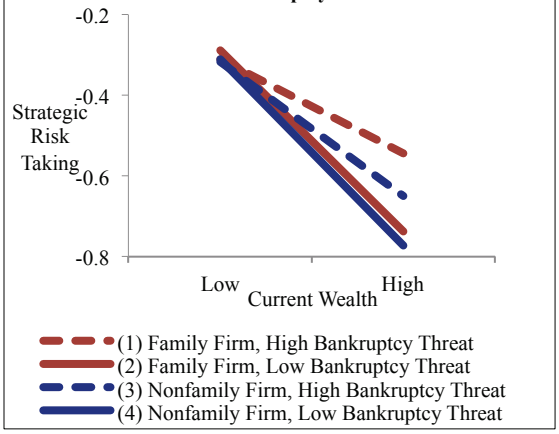


FIGURE 1F
Interaction of Prospective Wealth, Family Firm and Bankruptcy Threat

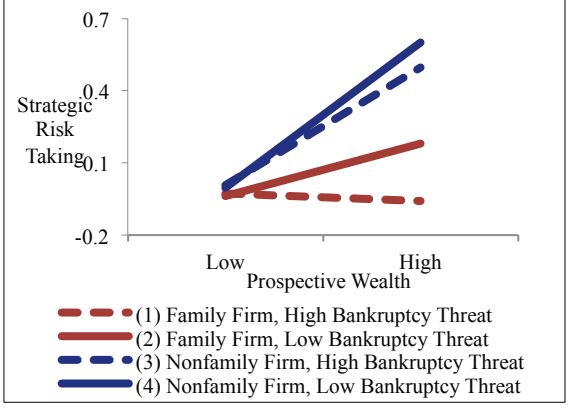


FIGURE 1G
Current Wealth, Family Firm and CEO Tenure

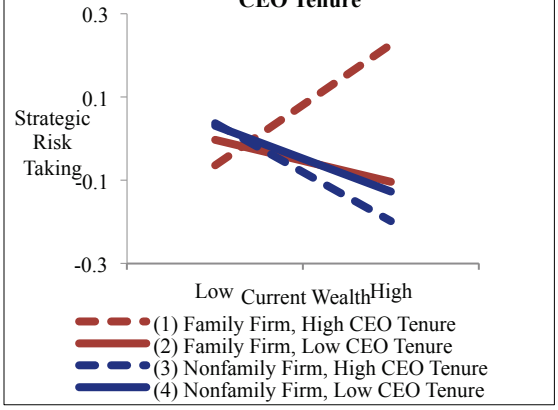


FIGURE 1H
Prospective Wealth, Family Firm and CEO Tenure

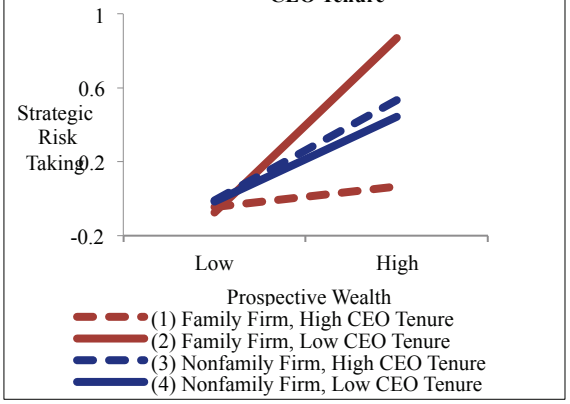
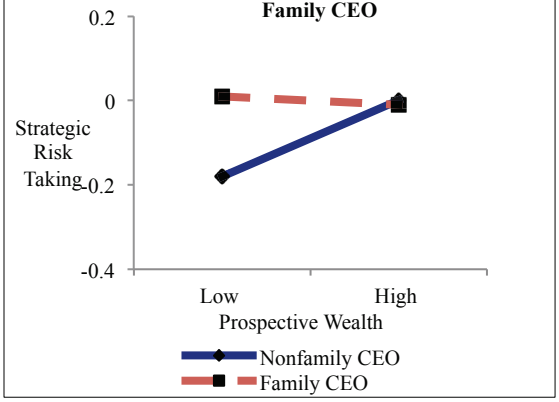


FIGURE 1I
Interaction of Prospective Wealth and Family CEO



Chapter 2

Family Firm Investment Horizons: Re-visiting the Effect of Ownership Structure Upon Temporal Orientation

2.1 Introduction

Family business scholars often argue that family owners are more prone to nurture the firm for the benefit of future family generations (Anderson & Reeb, 2003; Arregle, Hitt, Sirmon, & Very, 2007; Gomez-Mejia, Cruz, Berrone, & De Castro, 2011; James, 1999; Kets de Vries, 1993; Le Breton-Miller & Miller, 2006; Miller, Le Breton-Miller & Lester, 2010; Sirmon & Hitt, 2003; Zellweger & Astrachan, 2008; Zellweger, Kellermans, Chrisman & Chua, 2012). That is, family owners may obtain non-economic benefits from investing in projects meant to support the future family offsprings that do not necessarily imply gains on the short-term (Block, 2010; Casson, 1999; James, 1999). This is because family owners are believed to be interested in achieving non-economic objectives such as preserving the family s legacy and its traditions across generations (Gomez–Mejia, Takacs, Haynes, Nuñez–Nickel, Jacobson, & Moyano–Fuentes, 2007), building lasting relationships with customers, suppliers and other stakeholders (Berrone, Cruz, & Gomez-Mejia, 2012; Block, 2010), and strengthening their social position in the community (Arregle et al., 2007). In the language of behavioral agency theory, the non-economic utility these decisions are intended to preserve are collectively referred to as the family s socioemotional wealth (SEW) or the "stock of affect related value that the family has invested in the firm" (Berrone, Cruz, Gomez-Mejia, & Larraza-Kintana, 2010: 82). Because of all these reasons, and given that family firms are less pressured by external investors to show immediate returns, they tend to enjoy what Sirmon and Hitt (2003) referred to as "patient capital."

Temporal orientation is defined as "the relative importance given in strategic choices to investments with differing distributions of costs and benefits over time" (Souder & Bromiley, 2012: 551). Thus, firms can make investment decisions with various investment horizons and their resulting temporal orientation is likely to be dependent upon their cumulative investment behavior. Specifically, temporal orientation is a dynamic attribute determined by the changes in firm´s investment decisions over time in response to internal or external firm-specific factors. Despite the theoretical argument that family firms operate with an extended temporal orientation – that transcends their current generation of owners – a substantial stream of empirical research contradicts the purported longer-term orientation of these firms. For instance, family firms are argued to be more prone than their non-family counterparts to make strategic decisions with negative long-term consequences for the firm s competitive position, such as under-investing in R&D (Block, 2012; Chrisman & Patel, 2012; Gomez-Mejia, Campbell, Martin, Hoskisson, Makri & Sirmon, 2014; Muñoz-Bullon & Sanchez-Bueno, 2011), opting for lower domestic and international diversification (Gomez-Mejia et al., 2010; Miller et al., 2010), less asset divestiture (Feldman, Amit, & Villalonga, 2014) or being less inclined to join a cooperative known to extend the firm s survival horizon (Gómez-Mejía et al., 2007). While this research has drawn conclusions regarding the temporal orientation of family firms, these conclusions have been highly inferential and the findings may be open to alternative interpretations. For instance, investments such as R&D can be both tactical (short-term) or strategic (longer-term) (Smit & Ankum, 1993). Similarly, divestitures can be argued to be both a resistance to short-term market pressure (Feldman et al., 2014) or value destroying over the longer-run due to the failure to exploit opportunities presented by under-performing business with valuable assets (Berry, 2010). Likewise, diversification may be undertaken to reduce firm risk in the short-term but over the long-term produces lower returns and thus makes the firm less competitive (Morck, Wolfenzon, & Yeun, 2004).

Our study advances knowledge regarding the temporal orientation of family firms relative to non-family firms in various ways. First, we use a novel proxy for the firm s temporal orientation – namely, durability of investments in fixed assets (or DIFA), such as plant, property and equipment (Souder & Bromiley, 2012) – that offers a more direct measure of firm s decisional time horizon than previous proxies, such as R&D or diversification. That is, unlike

other proxies for temporal orientation, DIFA is calculated with the primary objective of measuring decisional time horizon (based on the useful life of the assets the firm chooses to invest in). We find strong support for the hypothesis that family ownership is associated with a longer temporal orientation (as captured by DIFA), challenging suggestions that family firms may not in fact adopt a longer temporal orientation than their non-family counterparts. By extension, our findings imply that family firm under-investment in R&D (Chrisman & Patel, 2012) or failure to diversify (Gomez-Mejia et al., 2010) may not be driven by differences in temporal orientation of family firms, but may instead be due to family prioritization of control (argued to be diluted due to R&D investment and expansion as a result of diversification) as a socioemotional objective, over the objective of dynastic succession (as opposed to a shorter temporal orientation per se).

Second, we advance the idea that family firm temporal orientation (relative to non-family) is contingent on the influence of outside investors – debt and equity holders. By considering divergent interests of family and non-family principals, we provide boundary conditions that allow for the reconciliation of previously conflicting perspectives regarding the temporal orientation of family firms relative to non-family firms. Our theory suggests that publicly traded family firms, which typically include multiple ownership forms, may be forced to compromise on their temporal preferences depending on how much overall control they enjoy. In support of this theory, we find that family firms tend to shorten their temporal horizons (as measured by DIFA) when large non-family equity blockholders and creditors are present. Clearly, the more control the family enjoys, the more durable the firm s investments (and thus the longer the investment horizon), and the opposite occurs as family control weakens (and thus the shorter the investment horizon).

Third, our results also suggest that family firms are less myopic in their temporal orientation than non-family firms across *all performance levels*, offering a refinement to the idea that performance leads to convergence in family and non-family decision making (c.f., Chrisman & Patel, 2012) by suggesting that this may not apply in the context of investment horizons (as captured by DIFA). Finally, our finding that family firms are less myopic than non-family firms is of great practical significance given the importance of family firms in most countries around the world (La Porta, Lopez-de-Silanes, & Shleifer, 1999) and the desire of investors to match

their investment horizon preferences with the temporal orientation of a firm s management and owners (Mueller & Reardon, 1993). Given longer-term managerial behaviors have been equated to long-term competitive advantages (Drucker, 1986; Marginson & McAulay, 2008), we also offer an explanation as to why family firms may outperform their non-family counterparts (Amit & Villalonga, 2014).

2.2 Theory and Hypotheses

2.2.1 Temporal Orientation and Investment Decisions

According to research analyzing the temporal aspect of firms´ investment decisions, "investments incur immediate costs to generate benefits later […], making theories of firm investment inherently temporal" (Souder & Bromiley, 2012: 551). Given that the temporal horizon of a firm´s investment decisions can have a wide range of costs and benefits over time, the concept of temporal orientation is critical in understanding the impact of investment decisions on firm´s long-term performance. To analyze the time horizon of family firms relative to non-family firms, we need to understand how temporality is experienced in terms of long-term and short-term orientation (Brigham et al., 2014; Laverty, 1996). Lumpkin and colleagues (2010: 241) define long-term orientation as the "tendency to prioritize the long-range implications and impact of decisions and actions that come to fruition after an extended time period". We propose that durability of investments in fixed assets (DIFA) captures this construct in a relatively unambiguous manner in comparison to other commonly used proxies such as R & D investments. Previous research arguing family firms have shorter temporal orientation due to R&D under-investment may be open to interpretation, given R&D can be both tactical and strategic; the implication is that R&D investments may be used to achieve both short-term and long-term objectives (Franko, 1989). For instance, R&D increases have been found to boost share prices in the short-term, suggesting that R&D is a useful tool when the firm´s decision makers have shorter-term share price objectives in mind (Woolridge & Snow, 1990). Also, there is much heterogeneity in the time horizon of R&D investments, particularly across industry lines (Chen & Miller, 2007).

2.2.2 Family Socioemotional Wealth and Behavioral Agency

The family is thought to place an emphasis upon satisfying various affective needs through firm ownership (Kets de Vries, 1993). As Ward (1987: 250) put it in his landmark book almost thirty years ago: “a family firm is a business that will be passed onto the family s next generation to manage and control”. Pursuant to family owners´ aspiration for transgenerational control, Gomez-Mejia and colleagues (2007) used a behavioral agency perspective to argue that the “affective stock” associated with family ownership is endowed by family principals, and key elements of that “socioemotional wealth” include maintaining family dynasty, reinforcing family firm identity, sustaining family members´ emotional attachment to the firm and extending family control for future generations (or “SEW continuance” for short; Berrone et al., 2012), all of which imply a long-term orientation.

The family business SEW literature has drawn upon the behavioral agency model (BAM; Wiseman & Gomez-Mejia, 1998) and prospect theory (Kahneman & Tversky, 1979) to argue that family owners are loss averse with respect to SEW. The concept of loss aversion suggests that individuals will prefer decisions that preserve existing (endowed) wealth rather than choices that pursue uncertain gains (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). According to this logic, family owners will avoid decisions that threaten SEW, despite that they may offer the potential of future economic gains (Berrone et al., 2010; Deephouse & Jaskiewicz, 2013; Gomez-Mejia et al., 2007, 2010; Leitterstorf & Rau, 2014; Zellweller et al., 2012). However, BAM s framework has been used to study a limited range of family firm behaviors and is regarded as nascent in general, but certainly in the context of exploring the time horizon of family principals (Chrisman & Patel, 2012).

2.2.3 Family Temporal Orientation

Family firms strategic behavior is highly influenced by the socioemotional benefit derived from dynastic succession, which is defined as the passing of the business to later generations (Berrone et al., 2012; Chrisman & Patel, 2012; Gomez-Mejia et al., 2011). This is because, as a result of strong blood ties between family members, “founding families view their firms as an asset to pass on to their descendants rather than wealth to consume during their lifetimes” (Anderson & Reeb, 2003a: 1306). In order to ensure this transgenerational transfer of family ownership and

control – which implies a considerable period of time for the new generations to take ownership of the family business – family firms need to make strategic decisions that enable firm longevity. As Lumpkin and Brigham (2011) describe, futurity, continuity, and perseverance are three components characterizing family firms´ strategic actions that are crucial in achieving such long-term objectives. Futurity implies a prospective orientation characterizing strategic decision-making, continuity refers to the appreciation of firm legacy and traditions, while perseverance represents the ability to make short-term sacrifices in order to achieve the long-term objectives.

Based on literature arguing that long-term business temporal orientation leads to superior financial performance over longer periods (Drucker, 1986; Jensen & Murphy, 1990; Laverty, 1996; Marginson & McAulay, 2008; Mueller & Reardon, 1993; Walsh & Seward, 1990), long-term strategies can lead to an alignment between the economic goals and the family goals related to SEW preservation, when goals are viewed over an extended horizon. According to Le Breton-Miller and Miller (2011: 1172), "it is impossible to achieve long-term objectives without embracing policies that continually nurture the resources—human, reputational, and financial—built up from the past, sustaining of the present, and instrumental in carrying an organization toward a healthy future". That is, in order to achieve long-term family goals, family firms need to focus on the concomitant achievement of past, present, and future objectives (Brigham et al., 2014). This may help explain, at least in part, why despite the purported negatives of SEW (such as nepotism, excessive control from the top, emotions entering into business decisions, managerial entrenchment as such; see review by Gomez-Mejia et al., 2011 and earlier work by Schulze and colleagues, 2001, 2003), family firms tend to outperform non-family firms (Amit & Villalonga, 2014).

Several strategic decisions associated with long-term investment horizons have been argued to pose threats to family SEW. For instance, local and international diversification decisions are said to weaken family control, thus creating SEW losses for dominant family owners, as they imply task delegation and loss of control, given the increased influence of new stockholders and creditors over strategic decision-making within the family firm (Gomez-Mejia et al., 2010). Likewise, several recent papers have argued that family firms attempt to preserve SEW by limiting R&D investments and thus avoid a real or imagined dilution of control associated with bringing in external expertise (Chrisman & Patel, 2012; Gomez-Mejia et al.,

2014; Munoz-Bullon & Sanchez-Bueno, 2011). An implication of this research is that family owners appear to adopt short-term strategies in order to preserve family SEW. Similarly, some research suggests that family firms manage earnings more so than non-family firms (Stockmans, Lybaert & Voordeckers, 2010), implying a short-term orientation given that earnings management leads to under-performance over longer periods (such as three or more years; Teoh, Welch & Wong, 1998).

In contrast to the conclusion that family firms are more short-term in their decision making, mostly drawn from the empirical studies reviewed above, theoretical work on this subject generally takes a contrarian position, arguing that family principals are longer-term oriented than their non-family counterparts. For instance, family firms are more likely (than non-family firms) to focus on developing market loyalty, high-capability employees and stable external stakeholder partnerships to prolong firm longevity (Arregle et al., 2007; Miller et al., 2010). In a similar fashion, family firms are more likely to feature concentrated ownership, lengthy executive tenures and profound business expertise, which are argued to each be associated with long-term strategies (Le Breton-Miller & Miller, 2006). An expanded time horizon can also manifest in a greater accumulation of slack resources, less strategic risk taking, and lower bankruptcy risk for family firms relative to non-family firms (Gentry, Dibrell, & Kim, 2014). Feldman and colleagues (2014) argue that family owners also prefer to retain rather than divest assets, which they claim is driven by a desire to assure management positions for later generations and maintain long-term relationships with employees, buyers and suppliers; the authors conclude that family firms "may shield themselves from the short-run pressure of the stock market through control-enhancing mechanisms such as dual-class stock, disproportionate board representation, pyramids, and voting agreements" and in consequence are more likely to make investment decisions with longer-term impact relative to their non-family counterparts. According to Anderson and Reeb (2003a), family members´ long-term presence and involvement with the firm allow them to focus on strategic decisions with longer-term impact relative to non-family firms. Building on this logic, Sirmon and Hitt (2003) introduced the concept of "patient capital" as a key distinguishing characteristic that separates family firms from other ownership forms. Patient capital is a type of financial capital without threat of liquidation in the short run; thus, it implies a longer investment orientation.

In sum, our brief literature review indicates that the extent to which family firms are long or short-term oriented remains an open question. The existing evidence, based on strategic choices indicative of a more myopic horizon in family firms (such as lower R&D, lower internationalization, lower diversification, reluctance to take on long-term debt and such) seems to be in sharp contrast with the dominant theoretical view that family firms will adopt a longer-term temporal orientation (cf., Berrone et al., 2012; Brigham, Lumpkin, & Payne, 2014; Gentry et al., 2014; Lumpkin & Brigham, 2011; Lumpkin, Brigham, & Moss, 2010; James, 1999; Sirmon & Hitt, 2003). What is missing from this confusing picture is a robust (and less equivocal) test of the theoretical proposition that family firms indeed have longer-term horizons than non-family firms (because of the alleged utility derived from dynastic succession, less pressure from short-term investors, patient capital). We therefore re-visit this theoretical question by examining the impact of family ownership on a unique dependent variable that distinctively captures temporal orientation, namely DIFA (Souder & Bromiley, 2012).

> *Hypothesis 1:* Family firms are more likely to adopt longer-term horizons than non-family firms as evidenced by their higher durability of investments in fixed assets.

2.2.4 Moderators of Temporal Orientation of Family Firms

2.2.4.1 Firm Performance and Family Firm Investment Horizon

Drawing upon the concepts of loss aversion, aspirations and expectations from behavioral decision research, Chrisman and Patel (2012) have argued that family firms face a trade-off between socioemotional and economic goals. Specifically, these authors argue that family firms are less motivated by the goal of preserving SEW when performance is below aspirations and hence become more myopic. This is because firm failure – leading to complete loss of family SEW – looms as a possibility if firm performance continues to decline; the result is a convergence of family and non-family firms in their strategic decisions in a low performance context. Likewise, Gomez-Mejia, Campbell, Martin, Hoskisson, and Simon (2014) argue that "the fear factor" induces family principals to devote more efforts to improve the firm s economic conditions than to preserve SEW and this leads to greater similarity in the strategic choices of family and non-family firms in a low performance context. Conversely, in a high performance context, socioemotional goals are more likely to be the dominant influence in family firm

decision-making, meaning that family firms are more prone to diverge from non-family firms in their strategic decisions. This suggests that divergence in family and non-family firm temporal orientations – as captured by DIFA – will be greater under higher than lower performance conditions.

> *Hypothesis 2:* The investment horizons of family (longer-term) and non-family (shorter-term) firms are likely to diverge as firm performance increases and converge (become more short-term for family) as firm performance decreases.

2.2.4.2 External Blockholders´ Ownership and Family Firm Investment Horizon.

Equity investors with large shareholdings in a firm, referred to as blockholders, are likely to have significant influence upon the firm s strategic decisions as their ownership levels increase (Bromiley, 1991; Wright, Ferris, Sarin, & Awasthi, 1996). Research analyzing the role played by external blockholders in decision-making in family firms as compared with non-family firms has demonstrated that blockholders will resist the family s attempts to pursue non-economic goals (Anderson & Reeb, 2004; Thomsen & Pedersen, 2000). While we acknowledge that some non-family blockholders (such as pressure resistant institutional investors) may be longer-term than others (Hoskisson, Hitt, Johnson, & Grossman 2002), as a group they should be more short-term focused relative to family owners who are inextricably tied to the firm for the benefit of current and future generations. Applying this logic, we argue that non-family blockholders are prone to resist the family s efforts to extend the firm s investment horizons in a way that may detract from short-term earnings (as would be the case with heavy investments in fixed assets).

According to Harrison, Bosse, and Phillips (2010), satisfying the shareholder´s demands is the right thing to do. Although family owners may be driven by their desire to protect SEW, they will still need to seek endorsement from their stakeholders (Cennamo et al., 2012) such as powerful blockholders in order to implement their strategic decisions. As a result, "the desire to preserve this socioemotional capital can induce firms with family ownership concentration to adopt a broad stakeholder orientation as a way to build strong relationships with stakeholders to support the firm s reputation" (Cennamo et al., 2009: 499). It follows that blockholder voting power (reflected by share ownership) is likely to diminish the family principal s ability to impose their investment preferences upon the firm by using that power to influence firm strategic decisions (Thomsen & Pedersen, 2000).

In sum, as the percentage of external blockholder ownership increases, socioemotional objectives are less likely to dominate the family firm s investment decisions, reducing the difference in temporal horizons (as captured by DIFA) between family and non-family firms.

> *Hypothesis 3:* Family and non-family firm investment horizons will converge at higher levels of external blockholder ownership. Specifically, family firm DIFA will be shorter at higher than lower levels of non-family blockholder ownership, meaning family firms with strong blockholder ownership adopt a similar temporal orientation to non-family firms.

2.2.4.3 Debt Financing and Family Firm Investment Horizon

The firm s creditors represent another ubiquitous stakeholder group with influence over investment decisions (Schulze, Lubatkin, & Dino, 2003). The firm s creditors – like the equity blockholders examined above – are likely to act as equalizers in the temporal orientation of family and non-family firms. Creditors should be keenly interested in the repayment of debt and thus should be less inclined to support a family firm´s attempts to further increase investment horizons, given these horizons are proportionate to cash fungibility of firm assets (Kanatas & Qi, 2004). Similar to equity blockholders, they will also lack the non-family socioemotional motives to extend the investment horizons of the family firm. Thus, through either the presence of creditors on the board or their influence over management through debt covenants (both are likely at higher levels of indebtedness), the discretion of family principals is likely to be restricted and investment horizons shortened. The result is that, again, the difference between family and non-family firms in their investments in durable assets should diminish at higher levels of debt ownership.

> *Hypothesis 4:* Family and non-family firm investment horizons are likely to converge at higher levels of creditor indebtedness. Specifically, family firm DIFA will be shorter at higher than lower levels of indebtedness, meaning family firms with greater indebtedness adopt a similar temporal orientation to non-family firms.

2.3 Methods

Data for this study have been taken from Compustat, Execucomp, Thompson Reuters Ownership Databases and Corporate Library databases for the period between 2001 and 2011. We restricted

the population to all the firms in the Corporate Library´s database that are classified in the manufacturing sector (firms with SIC codes between 2000 and 4000) because capital investments are more ubiquitous and relevant in these industries (Miller & Bromiley, 1990; Martin, Gomez-Mejia, & Wiseman, 2013). In total, we had a sample of 5960 firm-years during 2001-2011.

2.3.1 Dependent Variable

As noted earlier, our dependent variable, *firm investment horizon*, is proxied by DIFA: plant, property, and equipment. Depending on the type of business segment, these capital assets can represent the bulk of a firm s total assets. Capital assets are expected to have a long life of use, almost always more than one year (or reporting period) and often more than five years, but are subject to technological obsolescence as well as wear. That is, in accounting terms, capital assets are exposed to depreciation. This means that once acquired, they usually have limited cash value in an open market. Usually, the depreciation expense for fixed assets is split among several periods covering their useful life.

We calculated durability of a firm s fixed assets as the ratio of the total gross value of the firm s fixed assets at the end of the current fiscal year to their corresponding depreciation and amortization expenses. This provides an estimate of the period of use intended for the capital equipment purchased (Souder & Bromiley, 2012). As Souder and Bromiley (2012) suggest, to ensure greater accuracy, we have focused on firms using straight-line depreciation, which constitute the vast majority of firms in our dataset. In accounting, straight-line depreciation is computed as the asset purchase price less its estimated residual value, divided by its estimated useful life. That is, the method assumes that firm assets depreciate equally each year until the end of their useful life.

2.3.2 Independent Variables

2.3.2.1 Family Control

The binary categorization of a firm as family or non-family controlled firm has been taken from the Corporate Library database. The Corporate Library defines a firm as family-controlled when "family members play a key role in both ownership and board membership; family members may not have full control of the shareholder vote (greater than 50 %) but will generally hold at least 20%". For each firm-year, we treat firm ownership as a dummy variable taking the value 1

when the firm is family controlled and 0 otherwise. While there is little consensus in the literature about the operationalization of family control (Gomez-Mejia et al., 2011), we should note that for our purposes the Corporate Library´s definition is reasonable for several reasons. First, it is more conservative in its ownership cut off than that of most previous family business and SEW related studies that typically set the threshold at 5 or 10 percent (e.g., Allen & Panian, 1982; Anderson & Reeb, 2003; Berrone et al., 2010; Chrisman & Patel, 2012; Gomez-Mejia, Larraza-Kintana, & Makri, 2003; Gomez-Mejia et al., 2010; Leitterstorf & Rau, 2014; Villalonga & Amit, 2006). Also, the Corporate Library´s cutoff is conservative in light of a long stream of research on large publicly traded firms as well as SEC reporting requirements that use a 5 percent ownership threshold as a conventional proxy for a principal´s capacity to exert major influence on the firm´s affairs (e.g., Bennedsen, Nielsen, Perez-Gonzalez, & Wolfenson, 2007; Dyl, 1988, 1989; Salancik & Pfeffer, 1980; Hambrick & Finkelstein, 1995; McEachern, 1975; Shinnar, Giacomin & Janssen, 2012; Tosi & Gomez-Mejia, 1989). Second, we used an independent data source to check for the presence of a family CEO (Securities and Exchange Commission [SEC] filings; Villalonga & Amit, 2006) and found that over 50 percent of the firms classified as "family controlled" by the Corporate Library have a CEO with blood ties to the dominant family owner. This clearly suggests strong and direct family influence in firms that the Corporate Library defines as family controlled. Lastly, use of a dichotomous family ownership variable is correlated in the .90s with other proxies for family influence such as family management, presence of family founder, and family representation in board (Gomez-Mejia, Chirico, Nordquist, & Hellerstedt, 2014).

2.3.2.2 Firm Performance

We measured firm performance as return on assets (ROA, computed by dividing firm´s net income by its total assets). This measure provides information on how efficiently firms transform their capital investments into net income and is probably the most widely used performance index in strategy research. ROA is highly dependent on the industry but it is an adequate measure for our study, which is limited to the manufacturing industry.

2.3.2.3 External Blockholders´ Ownership

The data on blockholder ownership was taken from Thomson Reuters Ownership Databases for the period of analysis. We measure external blockholders´ ownership as the total percentage of

shares owned by external parties other than family, each of which holds at least 5% of the firm s shares. A firm can have more than one blockholder, and large blockholders are expected to have more influence over firm decision-making than minor shareholders (Fama & Jensen, 1983a, 1983b; Hoskisson & Hitt. 2002; Thomsen & Pedersen, 2000).

2.3.2.4 Firm Debt

We use the firm´s declared long-term debt in the reporting year as an independent variable in order to analyze its influence upon the family principal´s investment decisions. Debt allows the lender to influence management via board seats, debt covenants, or other contractual arrangements (Gedajlovic & Shapiro, 1998).

2.3.3 Control Variables

We control for *firm size*, represented by total sales, to verify that growth or shrinkage over time does not affect our results. This controls for the firm s capacity to generate cash that can be reinvested in capital assets. We also control for *cash flow from financing*, which may be invested in capital assets (Eisenmann, 2002; Gedajlovic & Shapiro, 1998), as can debt. Consistent with research predicting temporal orientation (see Souder & Bromiley, 2012), we control for the *value of shares owned by the CEOs as a proportion of their total pay* and *cash compensation as a proportion of total pay.* We also control for several CEO characteristics such as *gender*, *age*, and *tenure*, as well as for *CEO duality* (by including a dummy variable that takes the value 1 when the CEO is also the board chairman and zero otherwise). Lastly, we created dummy variables to control for individual year and industry effects.

2.3.4 Estimation and Procedure

In accord with previous research using panel data (e.g., Martin et al., 2013), we checked for fixed or random effects by running the Hausman test (1978) to check for possible non-correlations between the estimated error and the independent variables (Certo & Semadeni, 2006). Our significant results (p-$value$<0.001, X^2=62.27) indicate that a fixed effects model is more appropriate. Hence, our fixed effects model treats all the explanatory variables as nonrandom, implying time-independent effects for each measure.

Before proceeding to the data analysis, we winsorized the data at the 1% level to control for possible extreme outliers, and standardized the non-binary variables with a mean of zero and one standard deviation. We lagged our independent variables by one year (Martin et al., 2013; Sanders & Hambrick, 2007). To estimate the coefficients corresponding to our hypothesis, we used the *xtreg* function with *fe* – fixed effects – criteria (using STATA).

2.4 Results

2.4.1 Empirical Results

Table 2.1 illustrates the descriptive statistics – means and standard deviations – of our variables before standardization, together with the correlation matrix. Table 2.2 displays the results of our regression models. The first model shows the relationships between our dependent variable, firm investment horizon, and the control variables. Model 2 incrementally adds the main effects, while Model 3 adds the interactions between the main effects and the family control dummy. Our graphs of the interaction effects use one standard deviation to reflect the low (-1 Std) and high (+1 Std) value (respectively) of the moderator variables.

Hypothesis 1 predicts that family firms have longer investment horizons – more durable capital investments or DIFA– than non-family firms. In agreement with our theoretical prediction, we find that the coefficient for family control is positive and highly significant for DIFA ($b= 0.09$ and $p< 0.001$, in Model 2). This provides strong support for the idea that family firms do indeed have longer investment horizons relative to non-family firms. Interestingly enough, family ownership in itself ($b= 0.09$, $p< 0.001$) is a stronger predictor of DIFA than a one standard deviation change in firm performance ($b= 0.01$, $p< 0.05$) when both of these variables are entered in a single model (Model 2).

Hypothesis 2 proposes that higher firm performance leads to greater divergence in family and non-family investment horizons and that conversely, investment horizons of family and non-family firms will converge as firm performance decreases. This hypothesis was not confirmed by the regression results, as the coefficient for the interaction term of family ownership with firm performance is not significant with DIFA as a dependent variable. This finding contradicts the idea that family and non-family firms diverge in their investment horizon as firm performance

improves. Rather, family firms consistently exhibit a longer temporal orientation than non-family firms across all performance levels.

In accord with Hypothesis 3, we find that the presence of large external blockholders attenuates the difference between family and non-family firm investment horizons, given the coefficient for the moderating effect is negative and strongly significant (b= -0.06, p< 0.01, for Model 3). This finding suggests that the presence of blockholders does indeed provide a boundary condition for the differences in family and non-family investment horizons predicted by Hypothesis 1. For each one standard deviation increase in the percentage of external blockholder ownership, family firm investment horizons diminishes by approximately 3% of the firm s annual average (for a graphic representation see Figure 2.1).

In support of Hypothesis 4, high levels of debt attenuate the difference between family and non-family firm investment horizons. The coefficient for the interaction term is negative (b= -0.42) and highly significant (p< 0.01) in Model 3 (for a graphic representation see Figure 2.2). More precisely, every one standard deviation increase in the family firm´s level of debt reduces DIFA by approximately 4% of its annual average. Thus, debt holders – similar to equity blockholders – exercise their contrarian influence within the family firm to shorten its temporal orientation when they have the leverage to do so.

2.4.2 Robustness test

To accommodate the possibility that higher temporal orientation encourages family investment in publicly listed firms – and therefore an endogeneity problem with our models – we conducted a robustness test using instrumental variables and two stage least squares analysis (2SLS). We used two instrumental variables that were strong predictors of family ownership: *firm age* and the *proportion of total compensation paid in equity* (Gomez-Mejia, Larraza-Kintana & Makri, 2003). Our results for the main effect of family ownership remained significant and positive, while the Sargan-Hansen statistic (provided by STATA *xtivreg2*) rejected the null (that instruments are exogenous; p< 0.01). The F statistic from the first stage analysis was 160.78 (p< 0.001) indicating strong predictive power of the instruments.

2.5 Discussion

This study has examined family firm temporal orientation relative to non-family firms and the contingencies that affect differences in inter-temporal preferences of family and non-family firms. Using investment in capital (durable) assets (DIFA) as a measure of firm temporal orientation, our findings strongly support the view that family firms are indeed more long-term in their outlook than non-family firms; however, this difference is contingent on the influence of equity blockholders and creditors, as reflected by the magnitude of their investment. Moreover, firm performance fails to alter the difference between family and non-family firm preferences with respect to investment horizons, given DIFA consistently remains higher for family firms across all performance levels; family ownership is also a stronger independent predictor of long-term investments than firm performance. These results contribute to both family firm literature and behavioral agency research in several ways.

First, we provide empirical support for the idea that family firm investment horizons – or temporal orientations – are indeed longer than the temporal orientation of non-family firms. This is consistent with previous conceptual work arguing that family firms enjoy and invest more "patient capital" (Sirmon & Hitt, 2003), in stark contrast to prior empirical research concluding that family owners are more myopic relative to non-family firms because they invest less in R&D (Chrisman & Patel, 2012; Patel & Chrisman, 2013), diversify less (Gomez-Mejia et al., 2010) or prefer not to join coops that provide substantial long term financial benefits (Gomez-Mejia et al., 2007). If, as our results suggest, family firms do indeed have longer investment horizons than non-family firms, it implies that family firms make the aforementioned strategic decisions (such as to under-invest in R&D) due to family socioemotional objectives unrelated to the investment horizon; that is, our results suggest R&D under-investment by family firms (relative to non-family) are more likely to be explained by the family desire to maintain control (due to the need to hand control to specialized R&D professionals), avoid information asymmetries (meaning non-family employees know more than the family about firm operations) and greater uncertainty, each of which is argued to negatively influence family SEW (Gomez-Mejia et al., 2014).[1]

Second, the lack of support for Hypothesis 2 provides the counter-intuitive insight that the family firm is likely to persist with longer-term investments than non-family firms,

regardless of firm performance. This provides a valuable refinement to family firm literature examining the role of firm performance in moderating the difference between family and non-family decision-making. A common view within this literature has been that family principals are more likely to pursue non-economic objectives as performance improves and the risk of failure or bankruptcy reduces (Gomez-Mejia et al., 2007, 2010; Chrisman & Patel, 2012). One explanation for our contrarian findings could be that family owners believe that longer horizons are likely to improve firm performance or reverse performance declines. Another reasoning could be that the family firm is less likely than its non-family counterpart to abandon an expectation of continuity, even when firm performance is decreasing. Our finding is thus in resonance with Block´s (2010) study, arguing that family owners are more committed to their employees (behave more socially responsible towards their employees) than do non-family firms, based on the view that avoidance of job cuts reflects a longer temporal orientation. Lastly, it is also possible that family principals may engage in self-delusion, having an overly optimistic view of the firm´s future. Regardless of the reason, however, our results suggest that family firm´s longer-term orientation (relative to non-family firms) does not depend on performance variations.

Third, our findings outlining boundary conditions for differences between family and non-family investment horizons, providing caveats for discrepancies in the temporal decision making preferences of family and non-family firms. Importantly, these findings allow for a reconciliation of contrasting views with regard to family investment horizons relative to non-family, given that family and non-family investment horizons are likely to converge when outside equity or debt investors gain influence. In doing so, we underline the influence of prominent stakeholders such as external blockholders and debt holders upon family firms decisions. That is, our findings suggest that family principals either willingly reach or are coerced into compromise by powerful debt and equity investors who prefer shorter-term investments (on the interplay between family and non-family stakeholders in family firm decision making, see, e.g, Miller & Le Breton-Miller, 2005; Block & Thams, 2008). This provides an important clarification with regard to the limits to the family principals power and influence over their firms´ decisions in publicly listed firms. As they take on more debt or give up more equity to outsiders, family owners are evidently less likely to be able to push their

agenda of longer-term investments, given that the non-family stakeholders with ever growing power appear to resist.

Fourth, the discourse examining family firm financial performance relative to non-family firms is nascent and evolving. Villalonga and Amit (2006) provided the important insight that family firms are more likely to outperform non-family firms when the founder is involved; although an extensive literature review by the same authors a few years later concluded that, when taken as a whole, family firms tend to outperform non-family firms (Amit & Villalonga, 2014). Interestingly, family firms have often been portrayed as having negative consequences for non-family shareholders for various reasons, including private use of firm resources, selective performance management, managerial entrenchment, nepotism, centralization of control and poorly considered dynastic succession in management roles (e.g., Schulze, Lubatkin, Dino, & Buchholtz, 2001; Schulze et al., 2003; Lubatkin, Schulze, Ling & Dino, 2005; Lubatkin, Durand & Ling, 2007; Morck and Yeung, 2003; Morck, Wolfenzon & Yeun 2004). These consequences are typically attributed to the family owners desire to preserve family SEW, which is thought to lead to the prioritization of non-economic goals over economic (see reviews: Gedajlovic et al., 2012, Amit & Villalonga, 2014). However, our theory and findings suggest economic and non-economic goals may not be incompatible, provided the timeline for those goals is extended. This is based on the widely held view that businesses with longer-term strategies outperform firms that have sought to achieve a series of short-term goals, when performance is measured over longer periods (Drucker, 1986; Jensen & Murphy, 1990; Laverty, 1996; Marginson & McAulay, 2008; Mueller & Reardon, 1993; Walsh & Seward, 1990). Thus, our analytical approach may offer explanations for long-term performance differentials between family and non-family firms. If this is indeed the case, our results suggest that family firms are likely to outperform non-family firms over an extended horizon, which is consistent with prior studies comparing the performance of family and non-family firms (Amit & Villalonga, 2014). If family firms are longer-term in their investment horizons (as our findings suggest) in the interests of maintaining family SEW through dynastic succession (as we argue), and longer-term strategies out-perform, then we add to the aforementioned discourse by providing an explanation for why the performance differential exists and offering an instance when socioemotional and economic goals are indeed compatible.

At a practical level, in addition to the managerial implications evident in the theoretical insights above, the finding that family firms are less likely to pursue short-term strategies is of value to potential investors or other firm stakeholders seeking to actively avoid involvement with firms pursuing myopic strategies. Conversely, investors who are interested in short-term returns are more likely to avoid family owned firms. However, as depicted by our moderators, the potential investor should also examine the presence of non-family blockholders and debt levels in order to build predictions about the likely temporal orientation of the family firm in which they seek to invest.

2.6 Limitations and Future Directions

Like most studies, this one has several limitations. First, we measured the temporal horizons of investment decisions by approximating the durability of firms capital investments within the manufacturing industry. To contribute to this research stream, future studies could attempt to directly measure the temporal horizons of other types of investments such as diversification, innovations or R&D across several industries. Second, it is likely that there is a constant balancing of short and long-term objectives with the objective of short term survival and ultimately, long-term outperformance. Future research of inter-temporal preference could delve further into how these tensions are managed differently by family and non-family firms. A different approach to studying family firm inter-temporal preferences could be to analyze the extent to which family firms invest in, or acquire firms because of their temporal orientation. This would allow for the study of the goals and values of a firm s management (and other stakeholders) and the extent to which those goals attract other family investors or debt and equity partners with goals and similar values investing in the firm.

2.B Tables

Table 2.1
Descriptive Statistics and Correlation Matrix

	Variables[a]	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12
1	Investment horizon	12.53	5.80												
2	Family ownership	0.05	0.22	0.00											
3	CEO gender	0.98	0.13	0.00	-0.02										
4	CEO age	55.99	7.17	0.15	0.03	0.07									
5	CEO tenure	15.51	8.89	-0.02	-0.03	0.07	0.34								
6	CEO duality	0.33	0.47	0.06	0.00	-0.04	0.14	-0.11							
7	Cash compensation	0.56	0.33	0.01	-0.09	0.02	0.02	0.28	-0.18						
8	Cash flow from financing	-124	731	-0.06	0.01	0.02	-0.03	0.08	-0.10	0.11					
9	Firm size	4,088	8,904	0.10	-0.03	-0.06	0.04	-0.12	0.15	-0.20	-0.46				
10	CEO shares	1.10	4.12	-0.06	0.07	0.01	0.02	0.22	-0.00	0.22	0.03	-0.03			
11	Firm performance	0.04	0.12	0.12	0.01	0.01	0.06	0.06	0.01	-0.16	-0.12	0.09	0.02		
12	External blockholders' ownership	0.00	0.95	-0.01	0.09	-0.04	-0.03	-0.11	0.00	-0.02	0.08	-0.16	-0.10	-0.12	
13	Long-term debt	915.97	2,482	0.07	-0.03	-0.05	0.05	-0.12	0.13	-0.17	-0.23	0.78	-0.06	0.02	-0.10

N = 5960
[*] Correlations with an absolute value greater than 0.03 are significant at $p<0.05$.
[a] Variable 1 is expressed in years. Variables 7 and 10 are expressed as proportion of total pay. Variables 8, 9, and 13 are expressed in thousands. Firm performance is measured as return on assets (ROA). Variable 12 is expressed as percentage.

Table 2.2
Regression Models Predicting Firm Investment Horizon

	Control Variables		Main Effects		Interactions	
	Model 1		Model 2		Model 3	
Independent Variables[b]	*Beta*	*S.E.*	*Beta*	*S.E.*	*Beta*	*S.E.*
CEO gender $_{t-1}$	-0.11	0.07	-0.09	0.07	-0.09	0.07
CEO age $_{t-1}$	0.01	0.01	0.01	0.01	0.01	0.01
CEO tenure $_{t-1}$	0.04**	0.01	0.03**	0.01	0.03**	0.01
CEO duality $_{t-1}$	-0.05***	0.02	-0.04**	0.02	-0.04**	0.02
Cash compensation $_{t-1}$	0.02**	0.01	0.02***	0.01	0.02***	0.01
Cash flow from financing $_{t-1}$	-0.05***	0.01	-0.03*	0.01	-0.03*	0.01
Firm size $_{t-1}$	-0.08***	0.02	-0.00	0.02	0.02	0.02
CEO shares $_{t-1}$	-0.05***	0.01	-0.05***	0.01	-0.05***	0.01
Firm performance $_{t-1}$			0.01*	0.01	0.01*	0.01
External blockholders' ownership $_{t-1}$			-0.01†	0.01	-0.01	0.01
Long-term debt $_{t-1}$			-0.28***	0.03	-0.27***	0.03
Family ownership			0.09***	0.03	-0.01	0.05
Family ownership x Firm performance $_{t-1}$					-0.03	0.02
Family ownership x External blockholders' ownership $_{t-1}$					-0.06**	0.02
Family ownership x Long-term debt $_{t-1}$					-0.42**	0.13
Constant	0.15*	0.07	0.07	0.07	0.07	0.07
R squared (within)	0.09		0.10		0.11	
R squared (between)	0.01		0.01		0.01	
R squared (overall)	0.09		0.10		0.11	
N	5,960		5,960		5,960	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05.
Please note that change in R squared for main effects and interactions models is significant at $p<0.001$.
Year and industry dummies are included in the regressions but not listed in this table.

2.C Figures

Figure 2.1
Interaction of Family Ownership with External Blockholders Ownership

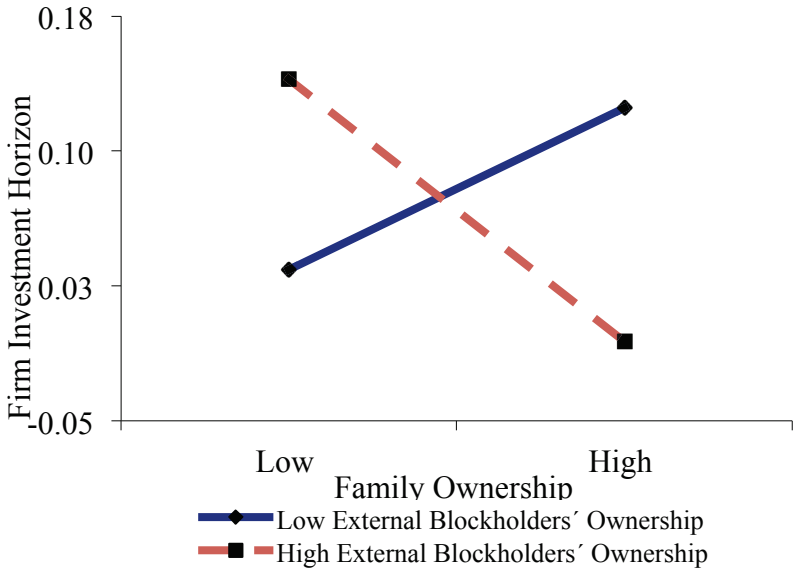
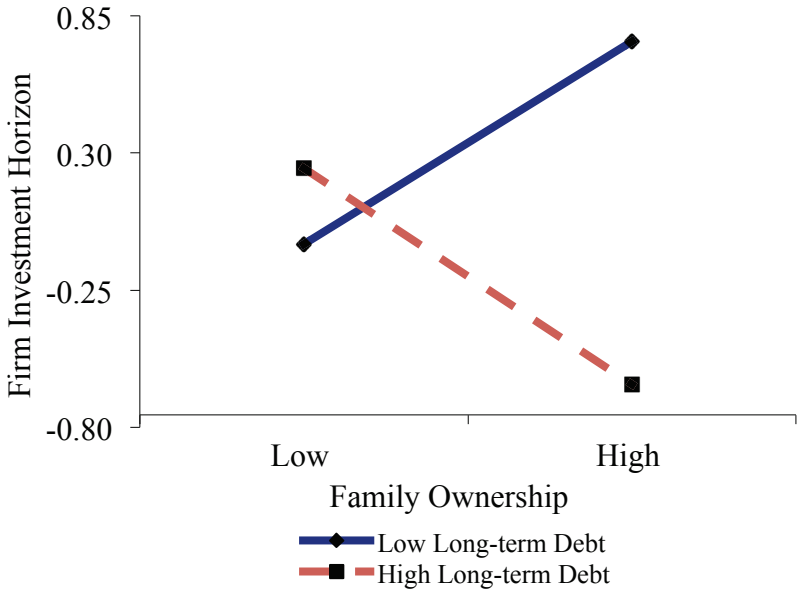


Figure 2.2
Interaction of Family Ownership with Long-term Debt



Chapter 3

Family Firms and Principal-Agent Incentive Alignment: The Use of Incentives and Technological Intensity

3.1 Introduction

Firms with strong innovative capabilities are expected to obtain greater profits than the less innovative firms. That is, in order to generate profits, firms need to make significant investments in R&D to sustain innovations (Balkin et al., 2000). The chief executive officer (CEO) is the main decision maker who takes strategic decisions on behalf of the firm. The CEO is responsible for the allocation of critical resources relevant to R&D investments, necessary for the development of new products and technologies. According to the behavioral agency model (BAM), agents (CEOs) are characterized by high risk bearing (wealth at risk). As such, in order to reduce the risk to their personal wealth, CEOs are prone to make strategic decisions (such as R&D investments) that are not necessarily meant to maximize firm performance (Beatty and Zajac, 1994; Miller et al., 2002; Wiseman and Gomez-Mejia, 1998; Zajac and Westphal, 1994). More precisely, the CEOs are likely to be concerned about the costs and risks associated with firm strategic decisions and favor R&D investments with lower risk to protect themselves against major financial losses. In technology-intensive firms, in order to account for these agency problems between firm owners and CEOs, scholars propose aligning CEO pay to firm innovation results (Makri et al, 2006; Balkin et al., 2000). More precisely, researchers argue that firms should reward their CEOs according to the resonance of their innovation efforts (such as their

patent citations) rather than based exclusively on financial performance criteria (Balkin et al., 2000; Makri et al., 2006). This type of alignment is likely to empower the CEOs to implement R&D projects with higher risk as they do not bear the entire financial risk characterizing such uncertain investments.

Researchers analyzing how the ownership structure influences firm strategic decisions tried to explain family firms decision-making through the lens of the behavioral agency model (BAM), derived from the combination of prospect theory and behavioral theory (Wiseman and Gomez-Mejia, 1998). According to this framework, family owners´ loss aversion to socioemotional wealth (SEW), or the stock of non-economic utility family owners invested in the firm (Gomez-Mejia et al., 2007), represents the main reference point for strategic decision-making (e.g., Berrone et al., 2010; Chrisman and Patel, 2012; Gómez-Mejía et al., 2007, 2010). That is, family firms will take risky decisions to preserve SEW at the expense of firm´s long-term financial wealth, yet they will also avoid taking risky decisions that may increase financial wealth to minimize the loss of SEW that is considered assured. For instance, when making strategic decisions, family firms will trade off economic and non-economic goals such as R&D investments (Block, 2012; Chrisman and Patel, 2012; Gomez-Mejia et al., 2014; Muñoz-Bullon and Sanchez-Bueno, 2011; Patel and Chrisman, 2013), international diversification (Gomez-Mejia et al., 2010; Miller et al., 2010), asset divestiture (Feldman et al., 2014), joining a cooperative (Gómez-Mejía et al., 2007) and its environmental strategy (Berrone et al., 2010), among others, to protect and prolong the socioemotional endowment characterizing the firm. Likewise, in a technology-intensive context, family owners´ loss aversion to SEW implies a series of challenges likely to influence the success of firm R&D projects that we further develop below.

According to the family business literature, some family specific characteristics lead family firms to have lower R&D intensity relative to non-family firms (Block, 2012; Block et al., 2013; Chen and Hsu, 2009; Chrisman and Patel, 2012; Gomez-Mejia et al., 2014; Muñoz-Bullon and Sánchez-Bueno, 2011). First, family owners need to seek external employees who posses related experience and technical skills; this measure increases family owner´s risk aversion given that non-family members may weaken family owners´ ability to control and monitor the R&D process (Carney, 2005), ultimately leading to SEW losses (Gomez-Mejia et al., 2010). Second,

technology-intensive firms may require substantial financing from outside parties (Sirmon and Hitt, 2003), which results in a weaker family control and influence over the firm´s strategic decisions. Lastly, unsuccessful R&D projects are likely to negatively affect firm´s reputation and consequently threaten the preservation of the socioemotional endowment characterizing the family firm (Dyer and Whetten, 2006). It follows that, when family owners decide that a more technologically intensive strategy is needed, family firms will invest in R&D projects that enable them to seek for both socioemotional wealth preservation and sustainable performance (Patel and Chrisman, 2014).

Nevertheless, in technology-intensive contexts, family firms must innovate to avoid failure. Despite the importance of R&D projects in influencing firm performance and growth, little is known about the commercial and technological importance of innovation outputs in designing the CEO pay in this type of firms. That is, there has been no attempt to understand how family owners risk bearing (dual SEW and financial wealth-at-risk) due to high levels of R&D investments influences the sensitivity of the relationship between CEO pay and firm innovation resonance (output). In this study, we integrate behavioral agency and family business research to suggest that, given the uncertain nature of R&D investments, family owners need to find efficient mechanisms to prevent or reduce the possible socioemotional and financial losses triggered by the loss of family control and failed innovations. We argue that, although family firms invest less in R&D than non-family firms (Block, 2012; Block et al., 2013; Chen and Hsu, 2009; Chrisman and Patel, 2012; Gomez-Mejia et al., 2014; Muñoz-Bullon and Sánchez-Bueno, 2011), they are likely to achieve better innovation results as they are motivated by the desire to avoid both socioemotional and financial losses. We hypothesize and empirically test that, as technology intensity increases, family owners are more likely than owners of non-family firms to closely align CEO pay with the resonance of firm innovative projects as opposed to performance results.

We extend this research by making several important contributions to the behavioral agency and family business literature. First, family business research on the innovation – CEO compensation relationship in technology-intensive firms has focused on the way family owners align CEO pay with the R&D inputs (R&D investments) and R&D outputs (number of patents and patent citations), ignoring the importance of considering both innovation and performance

criteria when analyzing the sensitivity between CEO pay and firm results. We contribute to this research by showing that family owners are more likely than their non-family counterparts to reward their CEOs for the resonance of firm innovations (measured as patent citations) rather than on performance bases (measured as return on assets). We find strong support for our hypothesis that the greater the technological intensity of a firm, the closer family firms will link CEO pay to innovation resonance as opposed to firm performance.

Second, despite the fact that family firms have been found to have lower R&D intensity relative to non-family firms, we advance the idea that family firms are likely to achieve more successful R&D investments than their non-family counterparts. Family owners are likely to have a better understanding of the family business and its processes relative to non-family owners, leading to a decrease in the information asymmetry between shareholders and managers (Miller and Le Breton-Miller, 2005; Ward, 2004). As a result of closer monitoring and a stronger alignment between firm management and family owners, family firms are more likely than non-family firms to achieve lower agency costs and more successful R&D investments (Block, 2012; Jensen and Meckling, 1976). We argue that as the firm becomes more technologically intensive – through taking risks in order to gain competitive advantage – family owners are more explicit in shifting the CEO´s focus from financial priorities to ensure that their socioemotional (non-financial) goals are not completely subordinated. Hence, when family owners decide that a more technologically intensive path is appropriate, they are disciplined in their pursuit of successful innovation by making sure the CEO pay is more sensitive to the resonance of firm innovation than to firm performance.

Finally, given that the family business is the prevalent ownership form around the world (La Porta et al., 1999), our finding that family firms are likely to achieve more successful R&D results than non-family firms is of great practical significance to both family owners and investors interested in understanding the investment behavior of family firms and in matching their investment preferences with the investment behavior of firm owners and executives. We suggest that, as family owners´ losses (financial and socioemotional) due to failed innovation may be higher than the equivalent losses for non-family owners (only financial), family firms are more likely to ensure that the CEOs will maximize the chances that the innovation investments are successful.

3.2 Theory and Hypotheses

3.2.1 Technology Intensive Firms and CEO Pay

Technology intensive firms are likely to outperform firms that are less innovative. Given that R&D investments may represent a source of competitive advantage, there is an increasing number of theoretical and empirical studies analyzing how firm innovation outputs can lead to superior economic performance (De Massis et al., 2013). That is, researchers argue that R&D investments can bring various benefits given that the innovation resonance of successful R&D projects positively affects firms´ ability to compete in the market and ultimately survive (Ahuja et al., 2008; Palmer and Wiseman, 1999). The importance of successful R&D projects is even greater in technology-intensive environments, characterized by rapid technological change (Gómez-Mejía et al., 2014). Successful R&D investments enhance firm´s dynamic capabilities and its adaptability in such rapidly changing circumstances. It follows that firm´s ability to rapidly adapt to such a dynamic environment represents a key element for firm´s success (Teece et al., 1997), making R&D investments crucial to firm long-term survival. Although this type of investment is meant to increase firm´s knowledge and absorptive capacity, it also requires a long time to pay-off and is characterized by a high degree of uncertainty (Block, 2012; Chrisman and Patel, 2012; Kor, 2006; Laverty, 1996; Lee and O Neill, 2003; Wu et al., 2005). As a result, higher levels of R&D investments are considered strategic decisions with an increased risk profile (Chrisman and Patel, 2012; Gómez-Mejía et al., 2014).

According to Hambrick and Finkelstein (1987), technology-intensive firms operate in a high-discretion context with two main consequences on CEOs´ compensation. First, due to high autonomy and wide ranges of potential choices when making strategic decisions implying an increase in R&D investments, these investments have a higher impact on firm´s positive or negative financial results. Second, an increase in R&D investments also implies higher uncertainty triggered by a greater variability of outcomes and a higher risk of failure. More specifically, the CEOs face a higher risk of termination and negative reputation in the market if their R&D investments don´t produce the expected outcomes (Wiseman and Gomez-Mejia, 1998). In consequence, as the investments in R&D increase, CEO pay should also increase accordingly to compensate them for the increased risk and to encourage a “good” CEO behavior (Balkin et al., 2000).

According to the behavioral agency model (BAM), agents (the CEOs) are characterized by high risk bearing (wealth at risk). Thus, in order to reduce the risk to their personal wealth, they are prone to make strategic decisions that are not necessarily meant to maximize firm performance (Beatty and Zajac, 1994; Miller et al., 2002; Wiseman and Gomez-Mejia, 1998; Zajac and Westphal, 1994). In consequence, as Gomez-Mejia and Balkin (1992) argue, maximizing a unique set of criteria such as the outcome based criteria can be dangerous for the incentive alignment systems since the affected decision makers may focus exclusively on performance outcomes and thus are more likely to manipulate results (for instance, through earnings management). Consequently, rather than choosing between linking CEO pay to either innovation results or financial results, using both options can represent a solution to these challenges. That is, if the incentive alignment systems are only to some extent linked to agent´s behavior, risk averse agents may take strategic decisions that are not likely to optimize firm´s returns (Makri et al., 2006). As Wiseman and Gomez-Mejia (1998, p. 137) argue, "the use of judgmental criteria is likely to increase agent risk bearing, resulting in greater preferences for lower risk strategic options". Thus, "those who fear the negative consequences of incentive alignment in terms of risk aversion suggest that cognizant board members should subjectively evaluate executives of R&D-intensive firms based on the soundness of their decision, rather than on observed financial outcomes" (Makri et al., 2006: 1060).

In a similar fashion, Garen (1994) argues that in technology-intensive firms there is a separation between CEO compensation and financial performance outcomes. That is, as performance variance increases and strategic decisions are characterized by a high degree of uncertainty, measuring CEO performance through the lens of financial results can be insufficient. It is more likely that, when outcomes are characterized by high uncertainty, shareholders will base CEO pay on criteria that are easier to observe and have a positive effect on financial performance (Balkin et al., 2000). In the specific case of technology-intensive firms, CEOs will be rewarded for the resonance of their innovation efforts (such as their patent citations) rather than based only on financial performance criteria. This type of alignment is likely to empower CEOs to implement R&D projects with higher risk as they do not bear the entire financial risk characterizing such uncertain investments.

In terms of design, the CEO pay is divided in short-term and long-term pay (Westphal and Zajac, 1994). Short-term pay is formed by CEO´s base salary and a short-term bonus as cash for performance results over a period inferior to one year. As per long-term pay, it is mainly formed by equity pay such as stock options and other types of equity compensation offered for achieving results over a longer period, usually three to five years. In a similar fashion, innovation results can be seen over a short-term or a long-term time frame. Over the short-term period, innovations results can be seen as a technical output in the form of intellectual property, when the patent is obtained; over the long-term, innovations are evaluated by the market and thus impact the stock price of the firm (Balkin et al., 2000). Overall, it follows that innovations have a long-term orientation and represent a crucial strategic decision for economic performance and firm growth (Tsao et al., 2015). These types of investments require R&D expenses in the period they occur, but they may not be successful or they may generate profits on the long-term. Therefore, by linking innovation resonance to CEO pay, firms may motivate their CEOs to invest in R&D projects that will bring them benefits on the long-run. Previous studies analyzing the relationship between firm innovation and CEO pay in technology-intensive firms have concentrated on the way innovation inputs (such as R&D investments) and innovation outputs (such as firm patents and the corresponding citations) align with the design of CEO pay (Makri et al., 2006). In this paper we focus on the way innovation outputs (the number of patent citations, what we call innovation resonance) influence CEO pay in technology intensive family firms.

3.2.2 The Behavioral Agency Model, Family Socioemotional Wealth and R&D Investments

From a behavioral agency perspective, family firms are different from their non-family counterparts (Gomez-Mejia et al., 2007, 2010, 2011). Family owners have large blocks of stock and in most cases have all their wealth invested in the firm. These undiversified portfolios give family owners strong incentives to closely monitor the activity of their managers (Demsetz, 1988; Fama, 1980). The family also represents the legacy and traditions that add to the family identity and values (Gomez-Mejia et al., 2011); family owners are interested in passing the firm from one generation to another and strengthening family firms´ economic situation to insure its survivability on the long-term (Block, 2012; Casson, 1999; James, 1999). This transgenerational

transfer of firm values and traditions encourages family firms to be longer-term oriented and to closely monitor the strategic decision-making process (Dyer and Whetten, 2006; Gomez-Mejia et al, 2007). The strong alignment between family firm´s reputation and its success is also likely to accentuate family firm´s tendency to closely monitor their managers (Block, 2012).

A common viewpoint of this research is that, even if family firms will not completely ignore the economic benefits resulting from their strategic decisions, the non-economic objectives are likely to prevail (Berrone et al., 2010; Gómez-Mejía et al., 2007, 2014). More precisely, family firms´ strategic decisions are strongly influenced by their loss aversion with regard to the stock of SEW. Family firms will weight potential SEW gains to potential SEW losses when making risky decisions such as R&D investments to get a more holistic image of the dual socioemotional and economic consequences of their actions. In fact, low-risk R&D investments meant to sustain firm growth are more likely to be consistent with family firm´s economic objectives than high-risk R&D investments. Family business research indicates that family owners´ preference for lower levels of risk affects the type and size of their R&D projects (Anderson et al., 2012). That is, undiversified shareholders such as family owners may prefer investments aligning with their own risk preference rather than following the investment rules preferred by non-family owners. In a similar way, researchers argue that due to internal conflicts, identity issues and goal divergence between family members, family firms are allocating their R&D resources less efficient than non-family firms (Dyer, 1994; Eddleston and Kellermanns, 2007; Schulze et al., 2001, 2003), making them more conservative relative to their non-family counterparts (Miller et al., 2010). Family business literature often refers to family firms as being fertile grounds for conflicts, generated from sibling rivalry, conflicts of identity and values, conflicts between generations, different goals of different family members (Harvey and Evans, 1994; Schulze et al., 2001, 2003), characteristics that are likely to affect the way family firms make strategic decisions.

Relative to non-family firms, family firms are also less eager to hire external employees to maintain family ownership and control and avoid conflicts of interest (Gomez-Mejia et al., 2010; Kim et al., 2008; Muñoz-Bullon and Sanchez-Bueno, 2011). At the same time, the lack of technical expertise and knowledge is likely to negatively affect how innovative a firm is. In addition, family owners are also less likely than non-family owners to use external financing as it

can reduce their control and influence over the firm (Gomez-Mejia et al., 2010; Kim et al., 2008). In a similar way, altruism is another family firm characteristic that is likely to weaken family firm´s ability to invest in technology intensive projects. As part of family firms´ resources may be used to rewards family members with preferential rewards and treatments (Schulze et al., 2003), altruism may diminish the influence of close monitoring, decrease firm resources allocated to investments and lead to lower R&D investments in family firms relative to non-family firms. Lastly, family ownership may have a negative impact on firm´s innovation capability since family owners may obtain private benefits (such as high dividends) over R&D investments at the expense of non-family shareholders (Muñoz-Bullon and Sánchez-Bueno, 2011). In consequence, family owners may attract less financial resources for innovation projects and thus engage less in costly investments such as R&D projects. Despite the potential financial benefits resulting from investments in R&D, some researchers argue that family firms invest less in R&D relative to non-family firms (e.g., Chen & Hsu, 2009; Chrisman and Patel, 2012; Patel and Chrisman, 2013; Gomez-Mejia et al., 2014).

We conclude from the above literature review that, due to the dual type of loss – socioemotional and economic – family firms are facing, family owners are likely to invest less in R&D than non-family firms. However, what is missing from this framework is the effect the R&D outputs (measured by innovation resonance) have on the design of CEO pay. Next, we discuss the influence of family ownership in aligning the resonance of firm innovations to CEO pay in technology intensive firms and introduce firm performance as alternative criteria for rewarding CEO to broaden our understanding of how the incentive alignment systems are designed in family and non-family firms.

3.2.3 Innovation Resonance, Financial Performance and CEO Pay

When family owners decide to take a more technology-intensive path they are likely to face a series a challenges that will affect the way they make strategic decisions related to R&D investments. First, high R&D investments may imply that family owners need to seek external employees who posses related experience and technical skills, which amplifies family owner´s risk aversion given their limited ability to closely control and monitor the R&D process (Carney, 2005). Second, employing non-family managers can weaken family firm´s control over the R&D process, leading to SEW losses (Gomez-Mejia et al., 2010). Third, technology-intensive firms

need substantial financial investments that in some cases require attracting financing from outside parties (Sirmon and Hitt, 2003), which in turn may dilute family owners´ control over the firm and cause SEW losses. Lastly, unsuccessful R&D projects may negatively affect firm´s reputation and thus threaten the preservation of the socioemotional endowment characterizing the family firm (Dyer and Whetten, 2006). Given these challenges, family firms are likely to invest in R&D projects that enable them to seek for both socioemotional wealth preservation and sustainable performance (Patel and Chrisman, 2014).

According to this logic above, family owners are likely to have a better understanding of the family business and its processes relative to non-family owners, leading to a decrease in the information asymmetry between shareholders and managers (Miller and Le Breton-Miller, 2005; Ward, 2004). It follows that family firms are also more likely to achieve lower agency costs and more successful R&D investments (Block, 2012; Jensen and Meckling, 1976), with family specific capabilities being crucial in avoiding dramatic SEW losses that are ultimately associated with firm survival (Gomez-Mejia et al., 2007). Ultimately, successful R&D projects may improve firms´ image and reputation and consequently lead to an increase in SEW. That is, the economic gains associated with successful R&D investments can further translate into socioemotional gains for the family firms.

In order to stimulate growth, technology-intensive firms may also need additional financing from external sources to sustain high levels of R&D investments, together with the development of other parts of the firm such as production, marketing and other organization areas. These investments require the use of external equity, borrowing money from debt holders or generating internal cash flow. In turn, equity holders and debt holders can dilute family control through restrictive agreements or reporting requirements (Chrisman and Patel, 2012). In addition, innovation also implies investing in R&D projects on the long-term, which may have an immediate negative impact on firm´s financial results (Hoskisson et al., 1993). Following this logic, firms should reward their CEOs according to the resonance of their R&D investments. Thus, firms competing in technological-intensive markets are expected to link CEO pay to evidence of innovation effort apart from the observed financial results. The greater the technological intensity of a firm, the more CEO pay should be aligned with innovation resonance

Given the risky nature of R&D projects and family firm´s aversion to dual socioemotional and financial losses we described above we argue that, when family owners decide to invest in technological intensive projects to gain competitive advantage, they are disciplined in pursuing successful innovation outputs by closely aligning CEO pay to innovation resonance as opposed to economic performance. This measure is meant at shifting CEO´s focus from performance objectives in order to assure that family firm´s socioemotional objectives are not at risk. As a result, we argue that family owners´ losses (financial and socioemotional) due to failed innovation may be higher than the equivalent losses for non-family owners (only financial). We conclude from the above literature review that family owners are more likely than owners of non-family firms to place more weight on the resonance of firm innovation projects (number of patent citations) than on economic performance measures such as firm´s return on assets (ROA).

Hypothesis 1: As technological intensity increases, family firms are more likely than non-family firms to link CEO total pay to innovation resonance as opposed to economic performance.

Hypothesis 2: As technological intensity increases, family firms are more likely than non-family firms to link CEO long-term pay (equity pay) to innovation resonance as opposed to economic performance.

Hypothesis 3: As technological intensity increases, family firms are more likely than non-family firms to link CEO short-term pay (bonus) to innovation resonance as opposed to economic performance.

3.3 Methods

We empirically test our hypotheses on a sample of firms obtained by combining Compustat, Execucomp, Thompson Reuters Ownership Databases, Corporate Library and the National Bureau of Economic Research (NBER) U.S. Patent Citations data files for the period between 1996 and 2006. In total, we test our hypotheses on a sample of 3804 firm years, over a period of 10 years.

3.3.1 Dependent variables

3.3.1.1 CEO Pay

Our dependent variables are CEO long- and short-term pay and CEO total pay. *CEO long-term pay* was estimated as the equity incentives such as stock options and other types of equity compensation offered over a longer period of time (Balkin et al., 2000). CEO short-term pay was measured using CEO´s annual bonus (Makri et al., 2006). *CEO total pay* represents the summation of CEO fixed pay (salary), CEO annual bonuses, equity pay and other compensations. All measures are taken from the Execucomp database.

3.3.2 Independent Variables

Family control. The categorization of the firm as being family or non-family owned has been taken from the Corporate Library database. According to this database, a firm is family-owned when family members have key roles in firm ownership and board membership and "will generally hold at least 20%" of the shareholders vote. We define the family control variable as a dummy variable taking the value 1 when the firm is family controlled and 0 otherwise.

Innovation resonance. The commercial usefulness of firm innovation is reflected by the granted patents, which are a raw proxy for technological and economic importance of innovation results. Patents represent a sign of credibility for potential investors, helping the firm attract capital in the future (Hall, 2002). Firms with higher potential to attract external capital are thus better at generating innovation outputs with significant resonance (Block et al., 2013). In particular, patent citations provide legitimacy to firms and make them more attractive to external investors (Häussler et al., 2009). We measure innovation resonance as the number of times a firm´s previous three years of patents have been cited by other patents. The data is taken from the NBER U.S. Patent Citations data files. The citations count was further converted to an index by dividing it by the average for all U.S. patents obtained in the same year and belonging to the same International Patent Classification (IPC) 4-digit subclass.

R&D investments are important for both innovation input and the significance of the innovation output obtained by the firm. However, R&D investments relate only to the resources used as input for firm innovations, not to the output firms obtain from the use of these resources. Moreover, R&D investments are meant at creating new knowledge, products and technologies,

but it is their commercial use that has a impact on firms growth and performance (Block et al., 2013; Hall et al., 2001; He & Wang, 2008). Prior research argues that, in technological-intensive firms, the number of patents is a better reference point for CEO incentives than firm´s observed financial results; patents are more straight-forward influenced by CEOs´ decisions and thus represent a clearer measure for their innovation efforts (Balkin et al., 2000; Makri et al., 2006). However, the importance of the patents for technological progress and the financial value they add to the firm can differ substantially from one patent to another (Block et al., 2013; Hall et al., 2005). In consequence, we analyze the number of patent citations received from other patents (what we call *innovation resonance*) to distinguish between patents of low and high economic and technological importance. Hall and colleagues (2005) show that patent citations are positively related to Tobin´s q, such that every one extra patent citation leads to a 3 percent increase in the market value. Therefore, the greater the innovation resonance of a firm´s R&D investments, the higher are the chances that the firm will obtain products and technologies with commercial value in the future (Makri et al., 2006). In addition, the higher the innovation resonance a firm produces, the more economic wealth the firm obtains (Trajtenberg, 1990). As a result, patents that are highly cited by other patents are more important for innovation progress and have a higher economic value relative to patents that are cited (Harhoff et al., 1999).

Technological intensity. We measured technological intensity as the ratio between firm´s annual R&D investments and firm sales, widely used measure by prior literature (Balkin et al., 2000; Carpenter and Wade, 2002; Makri et al., 2006).

Firm performance. We measured firm performance as return on assets (ROA, computed by dividing firm´s net income by its total assets). ROA measures how efficiently firms transform their capital investments into net income.

3.3.3 Control Variables

We control for several firm characteristics such as *firm size*, represented by total assets (to check that changes in firm´s size over time do not affect our results), *firm slack* as well as *inventories*, *external blockholder ownership* and *company age*. We also control for several CEO characteristics such as *gender*, *age*, and *tenure*, *CEO duality* (dummy variable that takes the

value 1 when the CEO is also the board chairman and zero otherwise). Lastly, we created dummy variables to control for individual year and industry effects.

3.3.4 Estimation and Procedure

In agreement with previous research using panel data (Certo and Semadeni, 2006; Martin et al., 2013), we checked for fixed or random effects by running the Hausman test (1978). Our significant results indicate that a fixed effects model is more appropriate. We also winsorized the data at the 1% level to control for possible extreme outliers, and standardized the non-binary variables with a mean of zero and one standard deviation. We lagged our independent variables by one year (Martin et al., 2013; Sanders and Hambrick, 2007). To estimate the coefficients corresponding to our hypothesis, we used the *xtreg* function with *fe* – fixed effects – criteria in STATA software.

3.4 Results

Table 3.1 illustrates the descriptive statistics (means and standard deviations) of our variables before standardization, together with the correlation matrix. Tables 3.2-3.4 display the results of our regression models.

Hypothesis 1 predicts that, as technological intensity increases, family firms are more likely than non-family firms to link CEO total pay to innovation resonance as opposed to economic performance. In agreement with our theoretical arguments, we find that the coefficient for the three-way interaction between technological intensity, innovation resonance and family control is positive and significant ($b=1.76$, $p<0.05$; Table 3.2, Model 4), while the coefficient for the three-way interaction between technological intensity, performance and family control is not significant. Interesting enough, the coefficients for the two-way interactions (between technological intensity and innovation resonance, as well as between technological intensity and performance) are significant and positive for the interaction with innovation resonance ($b=0.12$, $p<0.05$; Table 3.2, Model 4) and negative and weakly significant for the interaction with performance ($b=-0.02$, $p<0.1$; Table 3.2, Model 4). These results provide support for our Hypothesis 1.

Hypothesis 2 proposes that, as technological intensity increases, family firms are more likely than non-family firms to link CEO long-term pay (equity pay) to innovation resonance as

opposed to economic performance. The results corresponding to out three-way interaction between technological intensity, performance and family control is positive and highly significant (b=3.06, p<0.001; Table 3.3, Model 4), while the coefficient for the three-way interaction between technological intensity, performance and family control is not significant. Moreover, the two-way interactions between technological intensity and innovation resonance is not significant, while the interaction between technological intensity and performance is significant and negative (b=-0.02, p<0.01; Table 3.3, Model 4). These results provide us with strong support for Hypothesis 2.

Hypothesis 3 predicts that, as technological intensity increases, family firms are more likely than non-family firms to link CEO short-term pay (bonus) to innovation resonance as opposed to economic performance. Hypothesis 3 was not supported by our empirical model.

3.5 Discussion and Conclusions

R&D investments relate to the resources employed for innovative activities not to its outputs in the form of new products, technologies and knowledge. However, when commercialized, innovation outputs have a direct impact on economic performance and firm growth (Block et al., 2013; Hall et al., 2005; He and Wang, 2008; Romer, 1990). Moreover, innovations differ in their importance for technological development and economic growth (Grabowsky and Vernon, 1990). The use of granted patent as a measure for innovation output reflects the novelty and usefulness of firm innovative knowledge. However, patents can differ significantly in their importance for technological importance and economic value (Block et al., 2013; Hall et al., 2005; Trajtenberg, 1990). To differentiate between patents of high and low technological and economic value, we use the number of patent citations as measure for innovation resonance. Patents receiving more citations from other patents are of higher technological and economic value than patents that receive fewer. Our analysis shows that, as technological intensity increases, family firms are more likely non non-family firms to link CEO pay to innovation resonance. In addition, as technological intensity increases, family firms are also less likely to link CEO pay to performance outcomes (relative to their non-family counterparts).

We make several contributions to the behavioral agency and family business literature. First, family business research on innovation – CEO compensation relationship in technology-

intensive firms has focused on the way family owners align CEO pay with the R&D inputs (R&D investments) and R&D outputs (number of patents and patent citations). We contribute to this research by showing the importance of considering both innovation outputs and performance criteria when designing CEO´s compensation packages. Second, we help explain how family and non-family firms differ in aligning CEOs´ pay with shareholder´s objectives from a dual perspective: socioemotional and economic. We argue that as the firm becomes more technologically intensive, family owners are likely to shift the CEO´s focus from economic goals to ensure that the threat to firm´s socioemotional wealth is reduced. Lastly, we show that, when family owners decide to engage in technologically intensive activities, they make sure that the CEO is strongly incentivized to achieve their innovation goals by aligning CEO pay to the resonance of firm innovations.

We further contribute to family business literature by arguing that, in a technology-intensive context, family-owned firms are more likely than non-family firms to align CEO pay with innovation resonance than with firm performance. We propose that family firms manage both CEO risk aversion to technological investments and family owners´ loss aversion to dual socioemotional wealth and financial losses by closely binding CEOs´ innovation results to their compensation packages. Using patent citation data we argue that, as technology intensity increases, family owned firms are more likely than non-family firms to compensate their CEOs based on the innovation resonance of their R&D projects than on economic performance criteria.

We conclude that firms can avoid myopic (short-term) or poor R&D investments by linking firm R&D output (innovation resonance) to CEO compensation. Our analysis shows that the link between innovation resonance and CEO pay is stronger in family firms than in non-family firms. We also show that family firms will place more weight on the innovation resonance of their R&D projects than on economic performance measures such as firm´s return on assets (ROA).

3.B Tables

TABLE 3.1
Descriptive Statistics and Correlation Matrix

	Variables[a]	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	CEO total pay	4,230	5,520															
2	CEO equity pay	57,515	164,484	0.25														
3	CEO bonus	572.49	799.90	0.55	0.17													
4	CEO salary	6.29	0.53	0.38	0.02	0.53												
5	CEO duality	0.31	0.46	0.13	-0.03	0.15	0.23											
6	Slack	0.49	1.13	0.00	-0.05	0.06	0.14	0.06										
7	Inventories	448.28	1,065	0.40	0.05	0.50	0.48	0.09	0.09									
8	Blockholders	2.04	1.48	-0.15	-0.18	-0.18	-0.11	0.06	0.03	-0.20								
9	Company age	40.85	37.56	0.07	-0.11	0.21	0.38	0.10	0.09	0.27	-0.14							
10	Firm size	7.03	1.60	0.51	0.17	0.58	0.71	0.16	0.16	0.67	-0.24	0.40						
11	CEO tenure	8.78	7.57	-0.03	0.19	0.00	-0.03	0.05	-0.04	-0.04	-0.04	-0.06	-0.09					
12	CEO age	54.97	7.33	-0.04	-0.02	0.09	0.22	0.15	0.08	0.09	-0.03	0.15	0.11	0.31				
13	Technological intensity	0.10	0.25	-0.04	0.00	-0.15	-0.20	-0.05	-0.06	-0.13	-0.05	-0.23	-0.26	0.04	-0.12			
14	Performance	0.03	0.13	0.11	0.11	0.20	0.15	-0.06	-0.08	0.07	-0.01	0.12	0.16	0.06	0.08	-0.50		
15	Patent citations	127.05	340.63	0.28	0.16	0.30	0.23	-0.03	0.00	0.36	-0.20	0.12	0.45	-0.02	-0.01	0.00	0.05	
16	Family control	0.05	0.21	-0.01	0.20	0.02	-0.04	-0.06	-0.04	0.03	-0.03	-0.06	-0.05	0.16	0.01	-0.04	0.01	-0.08

N = 3,804
* Correlations with an absolute value greater than .03 are significant at $p < 0.05$.
[a] Variables 2 and 3 are expressed in thousands. Variable 4 is the natural logarithm of CEO´s fixed pay. Variable 7 is expressed in millions. Firm size was measured as the natural logarithm of firm assets. Performance was measured as ROA

TABLE 3.2
Regression Models Predicting CEO Total Pay

	Control Variables		Main Effects		Family Control Interactions			
	Model 1		Model 2		Model 3		Model 4	
Independent variables (t-1)	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**
CEO duality	0.02	(0.04)	-0.05	(0.05)	-0.04	(0.05)	-0.04	(0.05)
Slack	-0.02	(0.02)	0.01	(0.02)	0.01	(0.02)	0.01	(0.02)
Inventories	0.44***	(0.04)	0.38***	(0.06)	0.38***	(0.06)	0.37***	(0.06)
Blockholders	-0.03	(0.02)	-0.04+	(0.02)	-0.04+	(0.02)	-0.04+	(0.02)
CEO Salary	0.13***	(0.03)	0.16***	(0.04)	0.15***	(0.04)	0.14***	(0.04)
Company age	0.36	(0.35)	0.49	(0.43)	0.42	(0.43)	0.40	(0.43)
Firm size	-0.04	(0.06)	0.02	(0.07)	0.02	(0.07)	0.03	(0.07)
CEO tenure	0.03	(0.02)	0.03	(0.03)	0.05	(0.03)	0.05	(0.03)
CEO age	-0.02	(0.02)	0.02	(0.02)	0.01	(0.02)	0.01	(0.02)
Technological intensity	-0.09***	(0.02)	-0.04	(0.03)	-0.08+	(0.04)	-0.08+	(0.04)
Family control	0.12	(0.09)	-0.14	(0.15)	-0.15	(0.15)	-0.38*	(0.19)
Perfomance			0.07***	(0.02)	0.08***	(0.02)	0.08***	(0.02)
Patent citations			0.03	(0.03)	0.03	(0.03)	0.02	(0.03)
Patent citations X Family control					0.84***	(0.19)	-0.27	(0.53)
Performance X Family Control					0.05	(0.08)	0.02	(0.09)
Technological intensity X Family control					-0.01	(0.24)	0.36	(0.30)
Technological intensity X Patent citations					0.11+	(0.06)	0.12*	(0.06)
Technological intensity X Patent citations X Family control							1.76*	(0.78)
Technological intensity X Performance					-0.02+	(0.01)	-0.02+	(0.01)
Technological intensity X Performance X Family control							0.08	(0.21)
Constant	-0.29***	(0.07)	0.25+	(0.14)	0.24+	(0.13)	0.24+	(0.13)
R squared (within)	0.08		0.10		0.10		0.10	
R squared (between)	0.16		0.15		0.17		0.17	
R squared (overall)	0.08		0.10		0.10		0.10	
N	3,804		3,804		3,804		3,804	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05; + denotes p value of less than 0.1.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year dummies are included in the regressions but not listed in this table.

TABLE 3.3
Regression Models Predicting CEO Long-term Pay (Equity Pay)

	Control Variables		Main Effects		Family Control Interactions			
	Model 1		Model 2		Model 3		Model 4	
Independent variables (t-1)	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**
CEO duality	0.06*	(0.03)	0.02	(0.04)	0.02	(0.04)	0.03	(0.04)
Slack	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)	-0.01	(0.01)
Inventories	-0.13***	(0.04)	0.11**	(0.04)	0.11**	(0.04)	0.11**	(0.04)
Blockholders	-0.03*	(0.01)	-0.04**	(0.02)	-0.04**	(0.02)	-0.05**	(0.02)
CEO Salary	0.05*	(0.02)	0.09***	(0.03)	0.09**	(0.03)	0.08**	(0.03)
Company age	0.18	(0.28)	-0.20	(0.32)	-0.23	(0.32)	-0.27	(0.31)
Firm size	-0.13**	(0.05)	-0.19***	(0.05)	-0.18***	(0.05)	-0.16**	(0.05)
CEO tenure	0.19***	(0.02)	0.15***	(0.02)	0.15***	(0.02)	0.15***	(0.02)
CEO age	-0.02	(0.02)	-0.00	(0.02)	-0.00	(0.02)	-0.00	(0.02)
Technological intensity	-0.03	(0.02)	-0.00	(0.02)	-0.07*	(0.03)	-0.07*	(0.03)
Family control	0.06	(0.07)	-0.13	(0.11)	-0.16	(0.11)	-0.57***	(0.14)
Perfomance			0.05***	(0.01)	0.06***	(0.01)	0.06***	(0.01)
Patent citations			0.06*	(0.02)	0.06**	(0.02)	0.05*	(0.02)
Patent citations X Family control					-0.14	(0.14)	-2.06***	(0.38)
Performance X Family Control					0.01	(0.06)	-0.07	(0.07)
Technological intensity X Family control					0.19	(0.17)	0.81***	(0.22)
Technological intensity X Patent citations					-0.02	(0.04)	-0.01	(0.04)
Technological intensity X Patent citations X Family control							3.06***	(0.57)
Technological intensity X Performance					-0.02**	(0.01)	-0.02**	(0.01)
Technological intensity X Performance X Family control							0.22	(0.15)
Constant	-0.00	(0.04)	-0.09	(0.10)	-0.09	(0.10)	-0.08	(0.10)
R squared (within)	0.06		0.07		0.07		0.08	
R squared (between)	0.00		0.03		0.02		0.02	
R squared (overall)	0.06		0.07		0.07		0.08	
N	3,804		3,804		3,804		3,804	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05; + denotes p value of less than 0.1.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year dummies are included in the regressions but not listed in this table.

TABLE 3.4

Regression Models Predicting CEO Short-term Pay (Bonus)

	Control Variables		Main Effects		Family Control Interactions			
	Model 1		Model 2		Model 3		Model 4	
Independent variables (t-1)	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**	**Beta**	**s.e.**
CEO duality	0.03	(0.03)	0.03	(0.04)	0.03	(0.04)	0.03	(0.04)
Slack	0.02+	(0.01)	0.02	(0.02)	0.02	(0.02)	0.02	(0.02)
Inventories	0.07+	(0.04)	0.12**	(0.05)	0.12**	(0.05)	0.12*	(0.05)
Blockholders	-0.03+	(0.01)	-0.04*	(0.02)	-0.04*	(0.02)	-0.04*	(0.02)
CEO Salary	0.09***	(0.03)	0.05+	(0.03)	0.05	(0.03)	0.05	(0.03)
Company age	0.65*	(0.31)	0.84*	(0.37)	0.86*	(0.37)	0.86*	(0.37)
Firm size	0.06	(0.05)	0.10	(0.06)	0.10	(0.06)	0.10	(0.06)
CEO tenure	0.04+	(0.02)	0.05+	(0.03)	0.05+	(0.03)	0.05+	(0.03)
CEO age	-0.00	(0.02)	-0.03	(0.02)	-0.03	(0.02)	-0.03	(0.02)
Technological intensity	-0.04+	(0.02)	-0.03	(0.02)	-0.06+	(0.04)	-0.06+	(0.04)
Family control	-0.02	(0.08)	-0.16	(0.13)	-0.18	(0.13)	-0.21	(0.16)
Perfomance			0.02	(0.02)	0.01	(0.02)	0.01	(0.02)
Patent citations			-0.03	(0.02)	-0.03	(0.03)	-0.03	(0.03)
Patent citations X Family control					0.05	(0.16)	-0.13	(0.45)
Performance X Family Control					0.05	(0.07)	0.04	(0.08)
Technological intensity X Family control					0.00	(0.21)	0.06	(0.26)
Technological intensity X Patent citations					-0.08	(0.05)	-0.07	(0.05)
Technological intensity X Patent citations X Family control							0.28	(0.67)
Technological intensity X Performance					-0.00	(0.01)	-0.00	(0.01)
Technological intensity X Performance X Family control							0.03	(0.18)
Constant	0.04	(0.06)	-0.54***	(0.12)	-0.53***	(0.12)	-0.53***	(0.12)
R squared (within)	0.11		0.11		0.11		0.11	
R squared (between)	0.12		0.15		0.15		0.15	
R squared (overall)	0.11		0.11		0.11		0.11	
N	3,804		3,804		3,804		3,804	

Key: *** denotes p value of less than 0.001; ** denotes p value of less than 0.01; * denotes p value of less than 0.05; + denotes p value of less than 0.1.
Please note that the change in R squared for main effects and interactions models is significant at $p < 0.05$.
Year dummies are included in the regressions but not listed in this table.

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